PROCEDURES IN HIGH-SCHOOL TEACHING

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PROCEDURES IN HIGH-SCHOOL TEACHING

BY

DOUGLAS WAPLES, PH.D.

ASSISTANT PROFESSOR OF SECONDARY EDUCATION
THE UNIVERSITY OF PITTSBURGH

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PREFACE

THE material contained in the following pages has been organized in the form of unit exercises. This form is intended to serve two important purposes, both of which have seldom been accomplished by any *one* textbook in the field of high-school methods. These purposes, are, first, to present a variety of classroom problems from which the teacher may select those most significant *for him;* and, second, to supply some of the information and guidance he needs in order to solve these problems successfully.

These exercise materials have been developed experimentally over a period of years and have proved useful to various types of training classes in their present form. As the word "exercise" implies, the book as a whole is not easy reading and is not intended to be. The chief purpose of each chapter is to challenge the teacher's thinking and to stimulate criticism; criticism of conventional methods of teaching, of the teacher's own standards and technique, and of the training course itself as an example of good teaching.

The writer gratefully acknowledges his indebtedness to Assistant Professor Bancroft Beatley, of the Graduate School of Education, Harvard University, for his criticism of the manuscript in its various stages of evolution; and to Professor W. C. Bagley, of Teachers College, Columbia University, for much helpful advice and

encouragement. Indebtedness to many publishers for their kind permission to quote is specifically acknowledged in the text.

D. W.

PITTSBURGH, PA.
July, 1924.

EDITORS' INTRODUCTION

THE editors deem themselves most fortunate in being able to present, as an early volume of the American Teachers College Series, a book of such exceptional merit as Professor Waples' *Procedures in High-school Teaching*. We believe that this volume represents the most thoroughgoing and successful effort that has yet been made to apply the accepted principles of teaching to the problem of teaching prospective teachers how to teach. The selection of typical procedures, the definiteness with which these procedures are described, and the concreteness with which they are illustrated bear abundant witness to the meticulous workmanship of the author. Beyond these virtues, however, is the patent fact that these procedures have been tested and retested, revised and refined, through years of patient practice. Seldom has a successful teacher been so successful in setting forth for others the essential elements of his own matured technique. We are confident not only that the book will find a wide field of usefulness in the professional education of high-school teachers but that it will also prove itself to be of large value to those engaged in the preparation of recruits for other branches of the teaching service.

J. A. H. K.
W. C. B.

INTRODUCTION

Two clearly defined methods of instructing teachers in training are possible. On the one hand, the principles and general methods of teaching may be presented in systematic order with the idea that application of these principles and methods shall be made by the student to the problems which confront him in the practice of teaching. On the other hand, the practical problems encountered in the art and practice of teaching can be listed and solved; and, while the solution is being formulated, principles and general methods of teaching can be introduced in the order and at the time they are needed.

The first method is the conventional method which has been used for a generation in teacher-training courses. Usually courses in educational psychology are given as the first of the sequence, followed in turn by general methods, special methods, and practice teaching. This plan was hit upon because it was felt that if the student knew the principles, he would be excellently prepared to apply them to specific problems. This method, however, possesses a very great handicap. While the principles may be rather easily learned in their bare denotation and while their acquisition is subject to easy testing, the application of these principles to specific problems is extremely difficult. This can be seen by an examination of current, everyday experiences. In government we

believe in the principles of democracy and can state them with greater or less definiteness, but it is extremely difficult for us to apply them to the specific problems of political life. In the ethical field the principle of service is extremely well known and believed in by millions of people; the difficulty that the individual encounters is in knowing when and where and how to apply these principles to situations in everyday life.

Consequently there is a feeling on the part of many thoughtful educators that to proceed from principles to applications involves a great deal of waste. Efforts are continually being made to eliminate this waste. In doing so, the second method of attack—that of proceeding from the practical problems to the principles involved in their solution—is being experimented with. The problem method of teaching, the case method, and the more recent and much-discussed project method are all examples of this attempt. The problem method of approach seems to care for this difficulty to a very encouraging extent. It furnishes a huge number of specific examples, so that when the principles involved in the solutions of the problems are collected, we find the same principles occurring over and over again, and the learner or student is able to see the meaning or application of the principles at the same time that he learns them. Systematic organizations of principles are undoubtedly valuable, but many feel that principles should be systematized after they have been taught in connection with specific problems rather than before.

The problem approach is not new. It is used everywhere outside the school. The farmer's son learns his agriculture by meeting one problem after another. The

homemaker's daughter learns to solve her problems by carrying out the routine work of the household. "Learning on the job" is the natural method of extra-school training. It can, of course, be objected that the farmer's son and the homemaker's daughter do not learn the principles underlying their occupations, but the answer to that is quite clear. The college of agriculture and the department of home economics using the same method would, while they are teaching the methods of handling problems of the farm and the home, teach the principles in connection with the methods.

Not only is this the natural method in instructing students, but it is being widely used in practice teaching, in clinics, and in business. The critic teacher bases her informal curriculum in the fundamental methods of teaching upon the problems which the student teacher meets in the classroom as they arise. In the hospital and in the clinic, the interne, as he meets one problem after another, applies and is given the reasons for the methods which the surgeon and physician use in handling cases.

As a further illustration we find in schools the use of cases in law, in salesmanship, and in business administration. In law, the actual court rooms may not be visited, but statements of cases which are frequently found in the practice of law are made with great definiteness, and the student learns his principles by the psychological method in his study and discussion of these. In salesmanship, stenographic reports of actual sales are used as a basis of learning the principles, methods, and the psychology of salesmanship. In business administration a similar method is used. Somewhat bulky vol-

umes containing elaborate statements of problems of administration form the basis of the course, and the principles and methods of business administration are taught in the discussion of these problems.

Dr. Waples in the present text has made an application of the problem method of attack to the teaching of methods of instruction. He has selected a number of typical problems which arise in the school room and has presented them in such a way that while the students are securing a solution of these problems they are at the same time learning the general methods and principles. The principles of teaching are not elaborated in the text, but they are elaborated in the references that are supplied in connection with the various problems. Furthermore, this use of references serves the purpose of systematizing the principles, since practically all the reference books are systematically organized.

The book is a notable contribution to the literature of teaching, and will be useful to those teachers who believe in the problem method of approach to methods of teaching. It will also be of educative value to teachers who are still doubtful about the value of the method and who wish to try it out and reach a decision as to its value.

W. W. CHARTERS.

THE UNIVERSITY OF PITTSBURGH,
July, 1924.

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PROCEDURES IN HIGH-SCHOOL TEACHING

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CHAPTER I

PURPOSE AND PLAN

THE contents of this book have been selected and organized with certain objectives in view. These objectives will be seen to differ considerably from those of the conventional textbook on methods of high-school teaching. Since these objectives are responsible for the form in which the material is presented, it is important for the reader to understand clearly just what they are. Otherwise the form is likely to cause confusion. This introductory chapter accordingly offers a brief statement of these objectives. This statement is followed by suggestions concerning the use of these materials in classes of different types. The reader is invited to study these objectives and to follow the suggestions for what they are worth. Since these suggestions are very general in character, they should be supplemented by examination of the table of contents and careful selection of the chapters to be studied. There are more procedures discussed than can be successfully treated in any one course of normal length, and no two classes are likely to derive maximum benefit from the same selection of chapters. The same selection is necessary regarding the sections

of each chapter, and with respect to the numerous lists of questions. It is not wise to attempt to cover the material with equal attention to each part.

Objectives

A. To distinguish essential factors in successful high-school teaching. — This is a necessary preliminary to the analysis of the teacher's work. Until the complex activity we call teaching has been broken up into various simpler activities, it is difficult to locate deficiencies which the teacher can correct by a reasonable amount of concentrated practice. One thing at a time is the rule for improvement in teaching as for improvement in other skills that are equally complex. Eighteen of the more obvious factors in successful high-school teaching are accordingly treated as somewhat separate units. But this distinction between various teaching procedures is, of course, more apparent than real. The more general procedures such as studying the pupil, motivation, and discipline include such specific procedures as the lesson assignment, the review, and the test; and this overlapping of procedures has been considered in arranging the sequence of chapters. The more general procedures as a rule precede the more specific procedures. Therefore in case a particular class has time to take up only a few of the procedures, this time will often be used to the best advantage if the chapters are studied in order. This advice should not, however, discourage an instructor[1]

[1] Throughout this chapter and elsewhere the term "instructor" is applied to the individual who conducts the training course. The terms "teacher" and "student" are applied interchangeably to the members of the training class, depending upon which term is clearer in the given context. The term "procedure" is used both in the general and restricted sense to mean "what the teacher does."

from concentrating first upon the chapters which deal with the more specific procedures whenever the class has had sufficient teaching experience to select these procedures intelligently. *The unit plan of organization is intended primarily to encourage such selection, both of chapters and of chapter sections, as will best meet the needs of the given class.*

B. To give practice in working out procedures for actual classroom use. — This is the essential purpose of each chapter and the main objective of the book as a whole. The procedures when worked out should therefore be applied as soon as possible to a high-school class the student is teaching. When no high-school class is available for this application, the procedures should be worked out with direct reference to a high-school class the student can observe or to one he expects to teach and should be criticized in detail by the teacher of that class or by the instructor of the training class. It is of course also necessary that the procedures be *specific.* Mere general suggestions regarding the procedure are seldom worth making since they must be specifically applied to pupils and subject matter before the procedure can succeed, and it is usually this application which most requires practice.

The other objectives mentioned below should contribute to this main objective.

C. To illustrate typical procedures in terms of various high-school subjects and types of class. — An effort has been made to furnish enough of these illustrative cases so that the individual teacher may find some which represent conditions in his own classes, but not so many as to obscure the main point of the chapter.

Whenever the illustrations supplied in the chapters do not apply directly to the teacher's own classes, other illustrations should be sought in the Selected References. The teacher should analyze these illustrative cases carefully before preparing his own procedures in order that he may be fully conscious of the requirements which an effective procedure must meet.

D. To demonstrate the high-school procedures that are recommended in each chapter by applying somewhat similar procedures to the training class itself. — Each chapter is intended to practice what it preaches. The procedures followed in each chapter are, so far as possible, those which the chapter recommends for high-school use. Each chapter, accordingly, contains one section in which the teacher is asked to estimate the effect of these procedures on himself. The purpose of this section is to render the teacher's understanding of these procedures as vivid and complete as possible before he attempts to apply them to his high-school class. With immature students this introspection should not be stressed and probably should not be attempted at all. For teachers in service and for some fourth-year students such introspection is an extremely useful means of "sizing up" teaching procedures in terms of their effect upon a class. It is often necessary for the teacher to *feel* the effect of a given procedure before he can fully understand just what this effect is, and without such understanding it is more difficult to select procedures to produce desired effects in high-school teaching. This section of each chapter should help to make the conduct of the training class an example of good teaching which the students may safely imitate in their high-school classes. It

should also permit the demonstration of procedures where no high-school classes can be conveniently observed.

E. To state as briefly as possible such principles as are likely to assist the teacher most in applying the procedures. — Wherever possible these principles are merely listed in outline and illustrated in other sections of the chapter. In discussing the more general procedures, the reader is referred to more nearly adequate statements of principles that are found in other sources.

F. To select readings of direct use to teachers in connection with their application of the procedures discussed. — The Selected References appended to each chapter are classified under the two heads of *parallel* and *supplementary* references. The parallel references should be read at least in part by all students to supplement the rather meager explanations contained in the chapter, since they have been confined so far as possible to a few good books which the teacher is most likely to own or to find in any library. The supplementary references are intended for the use of students who have time and interest to investigate special phases of the various topics. These supplementary references should also include appropriate readings in books on methods of teaching special subjects, as listed in the Appendix.

Suggestions

It is evident that the emphasis given to the objectives listed above must depend upon the type of class using the book as a basis for class or individual study. Since these objectives indicate the purposes of the various sections of each chapter, it should be easy to secure a proper emphasis of these objectives by simply

omitting those sections which relate to objectives that the reader or instructor considers relatively unimportant. A few general suggestions concerning the relative importance of these sections are offered here on the basis of experience with training classes of the following types.

A. Courses in "General Methods in High School," "Principles of Teaching in Secondary Schools," etc. — Classes largely composed of teachers in service may safely select the procedures to be studied if the entire series is examined before the selection is made. No more of the procedures should ordinarily be attempted in any one course than will allow at least two full periods for the discussion of each procedure. Where the procedures are tested out on a high-school class by each student, still more time is required. In this case the students are likely to profit most if asked to read the chapter over rapidly, check the sections not considered important, note debatable points for discussion, select and adapt procedures for their own class use, apply these procedures to one or more classes, and report both the procedures and the results to the training class for general discussion. In large classes the instructor may assign the procedures for experiment and report in advance so that the reports will be evenly distributed. The members of the class not reporting should be expected to prepare the same procedures for use in their own classes so that the audience to which the reports are made shall be sufficiently critical.

When classes are large and composed of both experienced and inexperienced teachers, the discussion of procedures often suffers on account of the short time that can be given to any one subject. Each student is likely

to feel that most of the class period is given to the discussion of problems in other subjects than the one in which he is interested. As a means of overcoming this difficulty, the writer has used the following class procedure with satisfactory results. At the first meeting of the training course the students are grouped and seated according to the subject which each prefers to teach. Each of these groups elects a chairman, who is usually the one who has had most experience in teaching. The general topic for discussion is then briefly analyzed for the class as a whole and examples are given (or found in the text) of specific problems which have been met in practice. Each member of the course is then required to write out on paper and submit to his group chairman from three to six specific difficulties which have been met in practice or which are anticipated. The type of high-school class, the specific subject matter, and other conditions which determine the procedure should be specified in each case. Each chairman then examines these difficulty sheets, selects three or more of the difficulties which seem to him most significant, and writes these on the board before the next class meeting. Thus when the class meets, the board contains a list of the significant difficulties met by experienced teachers of the group for each of the subject groups represented. Each group then confers at the same time upon the difficulties which its chairman has selected, the instructor passing from group to group to offer whatever guidance is necessary. When working conclusions are reached, the chairman of each group reports to the class as a whole on the procedures which his group considers effective in meeting the difficulties listed. These

reports are then criticized by the class as a whole. When all reports have been given and criticized, the instructor may well summarize the common elements in the procedures discussed. Each member of the course then selects some one difficulty and writes out the procedure he would use in meeting it. These are handed in, read by the instructor, and returned with comment to the student. Other chapters are then taken up in the same way. This plan of work is well adapted to any course in high-school methods for which observation or practice facilities are not available and is particularly useful in classes of experienced teachers. When the class is evenly divided between experienced and inexperienced teachers, the latter probably benefit as much from the group discussions of these specific difficulties as from any other type of instruction. The routine, moreover, is not too complicated to be learned in two or three meetings and serves to focus discussion upon the students' own difficulties.

B. Observation courses in high-school methods for undergraduate students. — The majority of such courses in American training schools are restricted to third-year or fourth-year students. These students are usually incapable of adapting procedures to a particular high-school class at the beginning of the course. In using the material with such classes, it has been found best to assign only the explanatory sections of the few first chapters, together with such collateral reading as will afford some real appreciation of the actual class conditions to which any successful procedure must conform. The training-class period may then be used to discuss these actual conditions in the high-school classes observed.

This may be followed by a study of the problems in the chapter which involve recognition of the conditions that determine the success of any procedure. Three or four weeks of this sort of discussion should prepare the class for the planning of their own procedures. This planning should be done in class and receive as much individual supervision as possible. If the class is sufficiently mature and the instructor is careful to introduce the idea gradually, the section of each chapter which calls for introspective judgments of the methods demonstrated in the training class may be used to great advantage. This section has been found particularly useful when no observations can be made of high-school classes.

C. Practice-teaching courses for undergraduate students. — As usually organized, such courses introduce the practice work gradually and only after the student has for some weeks observed the high-school class he is later to teach. During this period of observation the procedures are probably best studied as recommended in the preceding paragraph. After the students have begun to teach, the problems in each chapter serve the purpose of organizing discussion in the training class upon a somewhat systematic basis. Without some such basis there is danger that minor details brought up by individual students (which are often best handled in private conference) will monopolize the training-class discussion. Whenever such details or problems are really significant, the instructor will naturally bring them to the attention of the class at some appropriate time. If the text is used as the organizing basis of the practice teaching, the procedures should be worked out by all students at the same time for application to the

high-school class each is teaching, whether these procedures can be applied at once or not. Occasions are almost certain to arise on which they can be appropriately applied before the end of the course. Experiments with various plans of organization have indicated that the plan above suggested is most likely to prevent serious mistakes in the practice teaching, since the study of procedures set forth in the earlier chapters will have prepared the practice teacher to meet many critical situations in advance of their appearance in his particular class.

D. Extension courses and teachers' meetings. — Classes of this type have the advantage of including only teachers in service who are all teaching in the schools of the same locality if not in the same school. These classes, however, must usually contend with the disadvantages of the short unit course and the limited time for preparation. It is therefore important that as much time as possible be given to the specific problems of the particular school or schools. Much time can be saved if the instructor of the extension class can obtain a list of such problems from the regular supervisor at the outset of the course. A principal in his conduct of teachers' meetings will naturally have some of these problems clearly in mind in advance. When the class has been organized for work upon these problems and has discussed the more hopeful solutions, the text may help to suggest other solutions or to indicate certain respects in which the procedures proposed by the class may be somewhat improved. For example, if general discipline is one of the problems chosen, the first meeting might analyze the situation to distinguish the duties of

administrative officers with regard to it from the duties of the classroom teachers. At this point the chapter which deals with classroom discipline might be read, and the class might discuss the different procedures described with direct reference to conditions existing in the particular schools concerned. This discussion should lead to some agreement as to procedures, which individual teachers will apply or not as each sees fit. Whenever the procedures recommended by the group *are* applied, the results of these applications should be reported to the class and further experiments made in accordance with the report. Whenever such classroom problems have been definitely located and analyzed, the most practicable solution is likely to be suggested by collecting as many solutions as possible and discussing the relative merits of each.

E. The individual high-school teacher. — The text is designed primarily for use in training classes. To what extent the procedures can assist the individual teacher who studies them independently must depend upon the nature of the teacher's problems and upon his ability to apply the procedures without further guidance than the chapters themselves supply. In the case of the more specific teaching activities that are taken up in the later chapters, the explanations and guidance supplied in the given chapter should ordinarily prove sufficient. In the earlier chapters these explanations should be supplemented by as wide reading in the Selected References as the teacher's time permits.

Whether the procedures are studied in course or independently, and whether studied systematically or used merely for reference — the Selected References

and the Index should be used consistently in order to obtain sufficient background for the study of each topic and in order to locate particular discussions of most importance to the individual teacher. So used, the procedures are likely to offer some assistance toward better solutions of the more persistent problems in high-school teaching.

Summary

In concluding this explanatory chapter, the writer wishes to emphasize a conception of the course in general method which it is exceedingly important for students of education to grasp, since failure to grasp it often leads the student to regard professional courses as in some way inferior to academic courses. This conception, which it is hoped the study of these procedures may help students to share, may be outlined in the following statements: First, the course in "methods" and the courses in subject matter are supplementary, mutually dependent, and equally important in their effects upon the average teacher's efficiency; provided, of course, that both are equally well taught. Second, the *content* of the course in "methods" is just as substantial as the *content* of courses in higher mathematics, history, or other academic subjects. Students often fail to observe that "content" and "method" are purely relative terms. They therefore conclude that courses in "methods" *have* no content and are consequently less substantial than academic courses in which the content is of the same character as that of the high-school courses they teach. Such students will more readily acquire a professional attitude toward courses in methods of teaching if this rather subtle fallacy is corrected. They

need to understand that *methods* of solving problems in teaching become the *content* of the training course just as methods of solving problems in mathematics become the content of mathematical courses. The one content is quite as real and objective as the other. Third, the *method* of the course in "methods" is the manner in which the instructor conducts the course. This manner of conducting the course is never perfect and is always open to criticism. The more intelligently it is criticized by the teacher in training, the more valuable the content of the training course is likely to prove. It is believed that persistent emphasis of this point of view has its reward in the closer coöperation of all concerned and in the improved status of the teacher-training course in academic circles.

CHAPTER II

INTRODUCING THE COURSE

THE first meeting of a high-school course is in many respects the most important meeting. First impressions are vivid. The teacher should therefore take every precaution to make these first impressions as favorable as possible.

On the first day of a term there are usually many routine matters to be attended to before the work of the course *can* be introduced. The class is not likely to be much impressed by these proceedings, since they are largely taken for granted. But the teacher's manner of attending to these details does much to determine the pupil's attitude toward the course. If seats are promptly assigned in accordance with a seating plan already placed on the board and attendance is checked by the vacant seats, if schedule cards and textbooks are found in proper number on the first desks of each row and rapidly passed, if the teacher understands such announcements from the office as he is expected to make, and the like — the class is likely to catch the spirit and settle down with a businesslike attitude.

When the time comes to take up the work of the course, the teacher will naturally be guided by many considerations that can not be known in advance. The work will be introduced in different ways, depending upon whether the class is beginning a new subject or

continuing one previously studied, upon the size and grade of the class, upon the curriculum -- college, commercial, etc. — in which the course belongs, and upon various other considerations. But for the introduction of courses in general, it would seem that *four* considerations are particularly important and that a teacher should be guided by these to some extent in the introduction of *any* course, even though time does not permit all four to be carried out at the first meeting. These may be outlined as follows:

Aims in Introducing the Course

A. To help the pupils understand as clearly as possible what the course is about and what benefit they may expect to receive from it. — This is usually undertaken by means of a rapid examination of the textbook, by an outline of units to be taken up, by describing certain topics to be studied that are more familiar to the pupils, by leading discussion from such a question as "What is geometry?" or by other familiar procedures — which are usually followed by a statement of the values resulting from study of the given subject.

A further procedure that has certain advantages over those above mentioned is for the teacher to give the class a sample of the work of the course and then let the pupils draw their own conclusions regarding its value. Such demonstration is more readily understood than the verbal description of unfamiliar subject matter, and it is also less likely to be misleading. It has the other important advantage of giving the whole class something interesting to do and of providing the satisfaction which comes from learning how to get

results in the new subject without unnecessary preliminaries. This feeling of achievement should be the motive for whatever effort the class is expected to put forth later, and it can not be experienced too soon.

Wherever this procedure applies, the teacher should select some simple and somewhat typical problem or item of subject matter which can be presented in familiar terms. The subject matter so selected should then be given in the form of a definite exercise which the pupils can work out in class. While such exercises may well be oral, a written exercise has the advantage of enabling the teacher to examine the papers out of class and so form some estimate of the pupils' abilities. For example, a course in *English* may be introduced by reading a short but vivid magazine article and then asking the pupils to write down what each considers to be the most important idea contained, or by asking each pupil to write out a humorous anecdote as well as he can and then have the papers exchanged and the stories read, or the class may be given a short vocabulary test and allowed to score it; a class beginning the study of *foreign language* may be shown a simple word list placed on the board and then be asked to make "sentences" by substituting the foreign words for their English equivalents; a beginning class in *algebra* may be introduced to arithmetical short cuts, magic squares, etc. and allowed to work them until they learn the trick; a class in *social science* may be given some simple social problem that affects the community and asked to select some one of various remedies which the teacher proposes and give reasons for the selection; the teacher of *natural science* may perform some such elementary experiment as that

of weighing air and ask the class to account for the results. Such exercises should be so planned as to occupy no more than about one third of the period.

Such reasons as are given for studying the subject, whether these are stated by the teacher or inferred by the pupils from the sample material presented, should be clearly related to ends which the pupils consider worth while.

B. To encourage the pupils to share responsibility for the course by allowing them to propose or select certain topics for study which seem to them most interesting. — The nature of the subject will of course determine how far this responsibility *can* be shared by the class. A course that is closely related to the experience of the pupils, such as English, civics, or practical arts, may well admit certain optional topics on the basis of the pupils' interest. In more formal subjects there is less free margin, but even such a course as first year Latin may well include collateral readings and other activities which the pupils themselves can select from or add to a list of such suggestions prepared by the teacher.

C. To obtain such information about individual pupils as will indicate those of very superior and very inferior abilities and help the teacher to determine the attitude and needs of the class. — A more thorough study of the needs of the class should be undertaken early in the course by some such procedures as are outlined in later sections (Ch. IV). On the first day it is seldom possible to do more than observe the class closely and note any pupils whose peculiarities are such as to require individual treatment immediately. Marked abilities and disabilities can often be discovered by means of

the introductory exercise recommended in *A* above. When this exercise can take the form of a simple diagnostic test (see Bibliography, pp. 327 ff.), the desired information is of course more easily secured, and any list of short questions permitting brief and very definite answers which the pupil can answer before he has begun the course can be made to serve about equally well. When no such test is given, it is advisable to have each pupil write answers to a few questions concerning his previous study of the subject or related subjects, his favorite subjects, his parents' occupations, his expectation of finishing the school course, and concerning whatever other items the teacher considers important. The discussion of optional material described in *B* above should also indicate something as to the pupils' special interests in the course.

D. To present very clearly the requirements which all pupils must meet in order to receive credit for the course. — In presenting such requirements, which should usually be written on the board, the form in which they are phrased has much to do with their effect upon the class. The requirements stated should not be so specific as to frighten the class, neither should they be so general as to have no definite meaning. In seeking this middle ground it is wise to lay emphasis on the abilities to be acquired rather than on the subject matter to be mastered. For example:

1. *To pass this course (in English) a pupil must have learned to write sentences in which the meaning is clear to the reader.*

2. *To pass this course a pupil must have mastered the fundamentals of English grammar.* While so far

as the pupil is concerned these two requirements are practically the same, the first statement is more likely to produce the desired effect than the second.

Such requirements can be further emphasized in connection with the first assignment of work, if when the assignment is made the teacher points out specifically how the work should be done in order to meet the requirements stated.

Section I: These Procedures Demonstrated

This section undertakes to suggest how a high-school teacher can introduce a course in such a way as to accomplish the four aims above mentioned. These methods by which a high-school course may be introduced apply as well to this course we are now beginning. It may, therefore, be helpful to introduce this course we are beginning *as though it were* a course in high school. You will then be able to apply the same methods in introducing your own courses in high school. You should also appreciate the effect of these methods upon your pupils more clearly as the result of having had the same methods applied to yourself. Each of the above aims will, therefore, be undertaken in what follows.

A. To help the pupils understand as clearly as possible what the course is about and what benefit they may expect to receive from it. — This course in methods of high-school teaching aims to make you a better teacher and a more competent critic of teaching by directing your attention to various useful classroom procedures, not all of which you are likely to discover by yourself without extensive reading. The course will also involve sufficient study of principles to help you to decide when

and why these procedures should be used. You will also receive practice in applying these procedures to actual class situations so that you may estimate their value, to some extent, by the results obtained. For a list of problems in high-school teaching from which those to be studied in this course will be selected, consult the Table of Contents.

To indicate the nature of these problems and the manner in which it is proposed to study them in this course, you are asked to solve the problem here described:

An inexperienced teacher in a small suburban high school meets his first class of forty-two first-year pupils on the first day of the term and under the following conditions:

1. All seats in the room are occupied, and more pupils are entering the classroom.
2. The office has not provided a list of the pupils assigned to the class.
3. Textbooks have not been received from the publishers, and no other text material is available.
4. The attitude of the class is boisterous and is fast becoming disorderly on account of the efforts of latecomers to take possession of the rear seats.

Assuming that you are the teacher in question and that the subject is your specialty, outline the steps you would take to secure order and introduce the course. Specify clearly and list each thing you would do in the order of its importance.

B. To encourage the pupils to share responsibility for the course by allowing them to propose or select topics for study which seem to them most interesting. — The benefit you yourself may expect from the study of any

one of the problems listed in the Table of Contents depends upon your ability to meet the problem in question at the present time. You may or may not find difficulty in meeting disciplinary problems, in making effective assignments, in conducting drill lessons, and the like, depending upon the kind of experience you have had, your special interests in teaching, and many other conditions peculiar to you. It is, therefore, quite impossible for any instructor to select those problems in high-school teaching which you *most* need to study. Unless you yourself select such problems, or at least indicate your present interest in them, this course is certain to be less useful than it might otherwise be. You are accordingly requested to indicate your needs as follows:

1. Make a list of about five problems from the Table of Contents which you think you most need to study. Do not copy the topics. List them by number in order of decreasing importance; that is, place the topic you consider most important first, and so on.

2. List also any other problems which you have found difficult to meet in your teaching and which you would like to have discussed in this course.

C. To obtain such information about individual pupils as will indicate those of very superior and very inferior abilities and help the teacher to determine the attitude and needs of the class. — For the instructor's guidance you are requested to submit brief replies to the following questions:

1. What high-school subjects are you qualified to teach? List them in order of preference.

2. What courses in methods of teaching or related professional subjects have you previously studied?

3. How many years' experience in teaching have you had? List with dates the positions you have held and specify the subjects and grades taught.

4. What sort of school position do you hope eventually to secure?

5. Please state frankly what you consider to be your best single reason for taking this course.

D. To outline the requirements which all pupils must meet in order to receive credit for the course. — Credit for this course, under ordinary circumstances, will be given only to those students who can show that they have acquired the following abilities:

1. The ability to understand and remember the more significant parts of assigned readings, exercise materials, and class discussions.

2. The ability to apply the general methods studied in this course to one or more of your own high-school courses and to work out these applications in such detail that you may be able to use them directly in your teaching.

Section II: These Procedures Applied to High-school Courses

How successful do you believe these procedures for introducing a course would prove in high school? *Consider the following questions:*

1. State briefly what you consider to be the important advantages and disadvantages of the "demonstration" method of introducing a course in your subject as compared with the other methods mentioned or with any other methods you can suggest.

2. Could you present the opportunity to discuss what the class most wishes the course to include in such a

manner that the majority of pupils would take the discussion seriously? How might such a discussion of collateral topics help you to discover the pupils' special interests in the general field of your subject?

3. In what sort of class is it important that some diagnostic test be given at the first meeting? When no such test is given, how useful do you consider a short list of questions to be as a means of obtaining important facts about individual pupils? What immediate use might be made of such facts at the next meeting?

4. Do you think a statement of requirements which pupils must meet to pass the course is likely to encourage the less able pupils or to discourage them? To what extent does the answer to this question depend upon the form in which the requirements are stated? Is there any danger that such requirements may lead the class to suppose that the course will be easier than it really is?

Section III: Specific Application

Apply the procedures demonstrated above to some one high-school class in accordance with the following suggestions. Have in mind a particular course which you either have taught or expect to teach. Make any changes in the procedures illustrated above that seem to you desirable, but make sure that your procedures cover to some extent the four aims proposed.

A. Describing the course. — Make a list of questions that will suggest the general character of the course to be introduced and prepare them with sufficient care so that they can be used in the classroom. Phrase the questions so that their meaning will be entirely clear to the pupils and make them as attractive as you can

without misrepresenting the content of the course. For example:

English:

How to find out what you want to know in the library.
How to discover writers who write exciting books that are worth reading.
How to write a letter in applying for a job.
How to tell a story so that others will like to hear it.

Latin:

How to guess the meanings of certain English words you have never seen before.
How to write and speak simple sentences in Latin.
How Roman life and customs have influenced modern life.

General Science:

How to find out what things are made of.
How to make such things as electric batteries, radio sets, balloons that will go up, and the like.

Mathematics:

How to save labor in solving problems in arithmetic.
How to understand the laws of chance.
How to solve equations.

History:

How to understand political discussions in the newspapers.
How great nations have become great.
How history helps to foretell the future.
How a business man may be a patriot.

Or, instead of preparing such a list of questions, select some typical item of subject matter and prepare an exercise which you might give the class on the first day as a means of *demonstrating* the sort of work which the course involves.

B. Optional material. — Illustrate the sort of optional material which you might safely allow the pupils

to select. Outline a procedure by which you might set the pupils thinking on the first day about what selections they will make; such as by listing sample problems, by suggesting books in which other problems can be found, by appointing class committees, or by any other procedure you think might work out well in the course you are considering. Be careful to avoid raising any false hopes with regard to the nature of the course. Your aim is to make the class share responsibility for the course by taking some part in its organization.

C. Class diagnosis. — Prepare a list of questions which you might ask the class to answer on paper as a means of obtaining useful facts about individual pupils and a general estimate of the needs of the class as a whole.

D. Course requirements. — List a few important requirements which a pupil must meet to pass your course. Phrase each requirement so that it will be entirely clear to the pupil and as definite as you think wise to make it. State each requirement also in such terms as will make it seem worth meeting for its own sake. Your requirements taken together should include the various skills and abilities which your course should develop.

Selected References

Parallel References for Group Study

S. S. Colvin — *Introduction to High School Teaching* (1917).
Pages 351–355 contain a brief reply to the question "What is method?" discussed in relation to the lesson plan.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter I presents a definition of high-school method in very simple terms.

A. R. Mead — *Learning and Teaching* (1923).
Chapter X states briefly the nature of method as delimited by laws of learning.

H. W. Nutt — *Principles of Teaching High School Pupils*, (1922).
Chapter III offers a somewhat exaggerated plea for a definition of method which identifies method of teaching with method of learning.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Pages 31–33 outline procedures to be used on the first day of school.

Supplementary Reference for Individual Selection or Assignment

J. Adams — *Modern Developments in Educational Practice* (1923).
Pages 7–13 very entertainingly describe the nature and origin of "new" methods of teaching.

J. H. Coursault — *Principles of Education* (1920.)
Pages 340–342 present a definition of method in terms of the function of method.

W. H. Kilpatrick — *Journal of Educational Method.* Vol. II, pp. 14–19, 54–59, 95–102, 144–150, 312–318, 367–374.
These articles outline the author's philosophy of method in very readable form.

F. B. Knight — "Analysis of Teaching," *Journal of Educational Research* (1924).
Describes three types of present investigation which seek to determine the significant elements in the successful teacher's equipment.

D. Waples — "Can High-school Principals Improve the College Training Program?" *Educational Administration and Supervision*, Nov., 1922, Vol. VIII, pp. 457–462.
Presents questionnaire data to indicate judgments of high-school principals regarding the relative merits of typical courses in education from the standpoint of their effect upon the teachers practice.

F. L. Whitney — "The Analysis of Teaching Functions," *Journal of Educational Research*, Vol. VII, pp. 247–308, April, 1923.
Applies refined statistical procedure to the selection of specific

skills in teaching that correlate most highly with professional success.

Additional References to Be Supplied by Instructor

CHAPTER III

THE HIGH-SCHOOL TEACHER'S ACTIVITIES

Learning to teach successfully is like learning to drive a car, learning to play golf or bridge, or learning any other complicated performance in that the learner must develop skill in several different operations all at once. To secure a driver's license, for example, it is not enough for the novice to be able to start the motor, regulate spark and gas, steer the car, and change gears, by performing each operation separately. He must be able to combine these and other operations properly and perform them at the same time or in proper sequence before he is qualified to drive. In much the same way the teacher's success depends upon the *combining* of various operations, each of which is best learned when practiced separately. But before he singles out any one of these operations for special practice, the teacher should recognize *the fundamental distinction* between successful and unsuccessful high-school teaching sufficiently to know when all operations are working in proper combination. That is, he should know good teaching when he sees it. The teacher should then *analyze his job* sufficiently to discover how each important operation makes for success in the total performance and how it is related to other operations. An attempt is made in what follows to state this distinction and to

outline a procedure by which the high-school teacher's job may be helpfully analyzed.

The fundamental distinction between successful and unsuccessful teaching lies in the amount and value of the learning that is stimulated in the pupils. This commonplace remark would be quite superfluous were it not so easy to find high-school "teachers" who are satisfied to go through the motions of teaching without any clear notion of what they are trying to do. It is as though it were argued — "The teacher often makes an assignment, comments on it the next day in class, asks the pupils certain questions to discover how well they have done it, and gives a mark. Therefore, if I do these things, I must be teaching." The fallacy consists in giving two very different meanings to the word "teaching," of which only one is legitimate. Teaching does not mean "performing the operations which teachers perform." It does mean "getting pupils to learn," and nothing else. When considered apart from their effects upon the pupils' learning, a teacher's activities are as entirely meaningless as those of a tennis player when the spectator can not see his opponent in the opposite court. These activities acquire meaning only when the pupils' reactions to them are known. The successful high-school teacher studies his problem, formulates his aims, selects his procedures, combines them, and carries them out *primarily in terms of the observed effect upon the pupils taught.* The unsuccessful high-school teacher usually takes these effects for granted. Herein lies the distinction.

Suggested procedure. — If teaching activities have little meaning except in terms of their effects upon the

pupils concerned, it follows that we must employ these terms in analyzing the teacher's job. The most helpful job analysis of high-school teaching might, therefore, be such as might be made by a supremely gifted high-school pupil who was able to distinguish the different factors operating on him in the classroom and the effects of each of these factors upon his learning. It may be possible for you to attempt an analysis on this basis. Imagine yourself in the place of the high-school pupil and think of this course we are beginning as though it were a high-school course. Then note the different kinds of factors which are operating upon you now and which combine to determine what benefit you are receiving from this course.

Section I: Factors in Learning Distinguished

A number of such factors in *learning* are listed below. Add such others as you think should be included under the various headings.

A. Factors which originate with you, such as:

1. Your present knowledge of the subject matter and previous study of it.
2. Your present interest in the subject.
3. Your desire to receive credit for the course.
4. Your health.
5. Your general intelligence.
6. The amount of time you can devote to preparation of assignments.
7. Your experience in teaching, both in amount and in kind.
8. Your special interests quite apart from this course.

B. Factors which result from the classroom environment, such as:

1. The temperature of the room, humidity, weather, etc.
2. Distracting noises or things to look at.
3. The location of your seat and convenience of arrangements for taking notes.
4. The lighting and opportunity to see the board.
5. The legibility of the words you are now reading.
6. The attitude of students sitting near you.
7. The general "mental atmosphere" of the room.
8. The length of the period, time of day, etc.

C. Factors which result from the presentation and treatment of subject matter, such as:

1. The topics selected for discussion.
2. The organization of these discussions.
3. The clearness and appropriateness of assignment.
4. The appeal which the problems discussed make to your common sense.
5. The relation of the topics discussed to your own teaching experience.
6. The instructor's voice and personality.
7. The pleasantness or unpleasantness of the discussion.
8. The amount of real thinking you are required to do both in and out of class.

D. The combined effect of all the above factors on you as the course progresses, such as:

1. Your perspective of the course as a whole.
2. Your ability to remember and apply useful parts of previous discussions.
3. Your understanding of what you are now reading.

4. Your interest in studying these problems beyond the course requirements.

5. Your ability to apply the course to your own teaching problems.

6. Your disposition toward more advanced professional courses as the result of this course.

Section II: Relative Importance of These Factors

Assuming that the above list contains most of the factors that have an important effect upon your learning in this course, *consider the following questions:*

A. To what extent does each of these four groups of factors (*A*, *B*, *C*, and *D*) help your present learning? List briefly in connection with each of the four factors as many specific reasons as you can discover to explain why the factor does not contribute more than it now does to your learning in this course. For example, your own physical condition may be below normal, the atmosphere of the room may be too formal or too nervous, the pace of the discussion may be too fast, or the instructor may not give you sufficient opportunity to state your difficulties.

B. Assuming that the instructor had only you to consider, how might he render each of these factors more effective? Reply as before by listing as many suggestions as you can under each of the four factors.

Section III: Factors in Teaching Distinguished

Working back from these factors in *learning* we should now be able to identify the factors in *teaching* which apply to these learning factors, as follows:

FACTORS IN LEARNING	FACTORS IN TEACHING
A. Factors originating with the pupil.	A. Diagnosing and motivating the pupil.
B. Factors resulting from the classroom environment.	B. Class management and discipline.
C. Factors resulting from the presentation and treatment of subject matter.	C. Technique, methods, and devices of instruction, applied to the given subject matter.
D. Combined effect of above factors as the course progresses.	D Testing or estimating results of above factors.

Consider these factors in teaching in connection with the following questions:

1. Which of these factors in teaching do you yourself find most difficult in connection with one of the courses you teach? List them by letter in order of decreasing difficulty.

2. What are the more important procedures involved in each of these four factors in teaching? List about three such procedures under *each* factor. Do this by selecting the three more important *factors of learning* in each of the four groups outlined in Section I and then suggesting a *teaching* procedure which applies to it, for example:

FACTORS IN LEARNING	FACTORS IN TEACHING
A. *Factors originating with the pupil.*	A. *Diagnosing and motivating the pupil.*
1. Present knowledge of the subject and previous study of it.	1. Questionnaire, conference, or diagnostic test to discover present knowledge and amount of previous study.
2. Present interest in the subject.	2. Note behavior in class.
3.	3.
etc.	etc.

Section IV: The Foregoing Analysis Applied

The problem. — A high-school teacher has "lost" one of his ninth-grade classes. He has made every effort to induce his pupils to memorize the facts contained in the textbook but with practically no success. His general method is to assign a lesson for home study, quiz the class upon it the next day, and then explain the points which have apparently not been grasped. He asks many questions during the period to which replies are meager and poorly expressed, and tests given after the first month of the course show that little information has been retained. The attitude of the students is always indifferent and often disorderly. Such response as the teacher does get is due largely to his practice of detaining after school and giving very low marks to those pupils whose recitations are unsatisfactory.

Assume that this teacher is in your department and that conditions in the class have become such that the principal has asked you to take permanent charge of the class immediately. Then state specifically (*a*) what you would do the first time you met the class and (*b*) what procedures you would employ in the attempt to secure better results at the completion of the course. In planning these procedures it is necessary to think out each one in detail. Avoid any such general suggestion as "get the class interested," and decide as definitely as you can *how* you would proceed to arouse interest, to secure more intelligent mastery of the material, and to meet the other problems presented. The following *outline for selection of method* should help to suggest procedures demanding attention, if each question is applied to the situation above. The outline can also be advanta-

geously applied to one of your own classes in which you suspect that your methods might be improved.

Procedure outlined. — Ask yourself such questions as the following:

1. What is the teacher trying to do? (That is assuming that the subject matter itself is useful, what mental activities does his teaching stimulate: appreciation of general principles, new points of view, etc.; thoughtful application of principles to the solution of worth-while problems; understanding of these principles in the abstract; memory of isolated facts, or other such activities?)
2. Is this worth doing?
3. Is this sufficient? What else should he attempt?
4. What do the apparent results indicate with respect to the effectiveness of the methods used?
5. What change in procedure might lead to more satisfactory results?

a. What factors in *learning* are not operating to the best advantage in the given class? (See list below.)

b. What factors in *teaching* can be utilized to make these factors in learning operate more advantageously? (See list below.)

c. What specific procedures are likely to prove more effective in the given class?

FACTORS IN LEARNING	FACTORS IN TEACHING[1]	SPECIFIC PROCEDURES
A. *Pupils' Characteristics*	A. *Class Diagnosis*	
1. Learning abilities and needs	1. Studying the pupil.	
2. Response to teacher's appeal.	2. Motivation.	

[1] Notice that the column headed *factors in teaching* consists of procedures discussed in this volume and listed in the Table of Contents. While these factors are chosen somewhat arbitrarily, they will probably be found to involve the more essential procedures in high-school teaching. Discussion of this problem should help to determine the selection of chapters for subsequent study.

FACTORS IN LEARNING	FACTORS IN TEACHING	SPECIFIC PROCEDURES
B. *Classroom Environment*	B. *Class Management*	
3. Order and efficient activity on part of pupils.	3. Disciplinary methods and responsibility given to pupils.	
4. Challenge to attention.	4. Use of the question.	
5. Opportunity for successful work in classroom.	5. Supervised study or directed learning.	
6. Organization of class work.	6. The lesson plan.	
C. *Nature of Classroom Activities*	C. *Methods of Teaching*	
7. Appeal to pupils' initiative.	7. The lesson assignment.	
8. Relation to pupils' needs.	8. Selection of subject matter.	
9. Relation to pupils' abilities.	9. Selecting lesson types.	
10. Appeal to pupils' feelings.	10. The appreciation lesson.	
11. General value of instruction.	11. Transfer of training.	
12. Guidance in clear thinking.	12. The process of reflective thinking.	
13. Appeal to pupils' common sense.	13. Teaching pupils to think.	
14. Opportunity to form useful habits.	14. The drill lesson.	
D. *Effect of Previous Learning*	D. *Testing*	
15. Value of results obtained.	15. The use of informal tests.	
16. Correction of defects.	16. The review exercise.	

Selected References

Parallel References for Group Study

W. C. Bagley — *The Educative Process* (1905).
Chapter headings of Part II indicate the scope and variety of teaching procedures from which the teacher may select.

W. C. Bagley and J. A. H. Keith — *An Introduction to Teaching* (1924).
Chapter II discusses the question, "What is teaching?" on the basis of different kinds of learning, each of which is clearly defined.

A. R. Mead — *Learning and Teaching* (1923).
Chapters I and II describe the fundamental character of learning in its simpler types.

H. L. Miller — *Directing Study* (1922).
Chapter III on the learning process offers convincing argument to the effect that the teacher should study his own learning processes.

The student may helpfully try to supplement the list of the high-school teacher's activities by consulting the chapter headings of a number of books on high-school problems and especially C. E. Holley, *The Teacher's Technique*, Chapter II; and W. E. Stark, *Every Teacher's Problems*.

Supplementary References for Individual Selection or Assignment

W. S. Burris — "Case Method for the Study of Teaching," *School and Society*, Nov. 26, 1921.
Describes the writer's investigation to collect and analyze significant teaching situations and thereby to present the problems of method objectively.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Appendix A contains a summary of replies from 100 teachers at the end of their first year of teaching to the question —"What are the essential things that a beginning teacher should keep in mind?"

W. S. Gray — "Rating Scales, Self-Analysis, and the Improvement of Teaching," *School Review*, Vol. XXIX, pp. 49–57.
Indicates the various bases on which teaching has been scientifically analyzed.

J. T. GREENAN — "The Teacher's School Week," *School Review*, Vol. XXIX, pp. 592–598.

Outlines the routine activities of high-school teachers as indicated by questionnaire returns.

A. L. HALL-QUEST — "The Cincinnati Plan of Teacher Training," *Educational Administration and Supervision*, Vol. X, pp. 129–141.

F. W. JOHNSON — "Supervision of Instruction," *School Review*, Vol. XXX, pp. 742–754.

Presents an excellent check list of standards which may be used as a basis for self-criticism.

H. P. MCLAUGHLIN — "Learning How to Teach from the Experience of a Student," *School Review*, Vol. XXX, pp. 621–626.

Supports the point of view advanced in the foregoing exercise.

A. R. MEAD — "Suggested Improvements for Preparing Secondary Teachers in Ohio," *Educational Administration and Supervision*, September, 1923, Vol. IX, pp. 325 ff.

Outlines an admirable program.

W. E. STARK — *Every Teacher's Problems* (1922).

Chapter XV presents problems of professional growth which deserve consideration at the outset of a course in general methods.

Additional References to Be Supplied by Instructor

CHAPTER IV

STUDYING THE PUPIL[1]

This chapter aims to emphasize the fact that the individual pupil rather than the class is the unit of instruction. Important though it is for the teacher to teach in terms of the group as a whole, such group teaching can not prove successful unless marked individual differences are discovered and provided for. The successful teacher must choose his methods with respect to their probable effect on the class. The more he knows about the abilities, the knowledge, and the interests of each pupil in the class, the more likely he is to foretell what these effects will be. While such information about every pupil in the class is useful, it is particularly useful in the case of the few pupils in every class whose special abilities or disabilities prevent them from receiving benefit from teaching which is adapted to the needs of the majority. It is a serious mistake to suppose that these useful facts concerning individual pupils can only be obtained by means of standardized tests and a complicated technique of measurement. The following examples illustrate the sort of information that any

[1] A most important study of pupil diagnosis in its relation to teaching technique is found in Part I of H. C. Morrison's *The Teaching Technique of the Secondary Schools*, Edward Bros., Ann Arbor, Michigan, 1924. The various degrees of a pupil's application during the class period are demonstrated by means of case-study profiles and discussed in terms of helpful teaching procedures.

teacher can easily obtain about his pupils and suggest some of the important uses to which this information can be put.

Section I: Kinds of Data Easily Obtained

Three important factors in a pupil's learning may be studied by the following kinds of data:

A. Data concerning ability to learn. — The correlation table below shows the ranks of 56 pupils of the University of Minnesota high school on the basis of an intelligence test, and also on the basis of their general averages in all school subjects. The Roman numerals at the top and at the left of the table indicate the rank. I is the highest rank and V is the lowest, etc. The figures in each column indicate the number of pupils obtaining each rank in the test and in general average of school marks. The blank space in the upper left corner of the table means that *no* pupils who scored in the highest of five groups in the test were in the lowest group for school marks. The numeral 2 in the second

Rank in Average of School Marks

Rank in Miller Mental Ability Tests	V	IV	III	II	I	Total
I		2	1	2	7	12
II	2	1		5	3	11
III	3	3	4		2	12
IV	2	3	3	1	2	11
V	3	3	2	2		10
Total	10	12	10	10	14	56

column of the top row under the IV and to the right of the I means that two pupils making the highest group in the test made the next to the lowest, the fourth group, in their general averages. The other figures are read in the same way. The figures between the diagonal lines show the number of pupils who hold very nearly the same ranks in the test that they hold in their general averages.

Make sure that you fully understand the table; then consider the following questions, assuming that the test score is valid and that the teachers have used their best judgment in assigning marks:

1. How might this table assist the principal in advising the pupils represented by the figures in the lower left-hand corner of the table?

2. Adding the numbers between the diagonals gives a sum of 38 pupils who hold nearly the same ranks in mental ability and quality of school work. Mention as many reasons as you can to explain why this group does not contain a larger proportion of the class.

3. Adding the numbers in the spaces below and to the right of the diagonals gives a sum of 9 pupils whose rank in school work is higher than their rank in the test. What particular kind of treatment do you think these pupils should receive?

4. Adding the numbers above and to the left of the diagonals gives a sum of 9 pupils whose rank in school work is lower than their rank in the test. What general treatment would you prescribe for this group?

5. In what respects do you think your own teaching might benefit by such data as these concerning your own classes? That is, how might you better adapt the work of a course to the needs of pupils working above

their abilities, below their abilities, and at their abilities if you could tell which pupils fell into each of these groups? Consider specifically such problems as the assignment, drill work, motivation, and discipline; *e. g.* Are assignments too difficult or too uniform in difficulty? Is drill work excessive in amount for certain pupils? Is motivation supplied by challenging the abilities of bright pupils? Is disciplinary trouble avoided by excusing certain pupils from courses unsuited to them?

B. Data concerning previous knowledge of the subject. — In the freshman year of a four-year suburban high school the following subjects were required: English, civics, general science, algebra, Latin or French, music, and physical education. At the teachers' meeting called to discuss the marks for the first quarter, the teachers of English, civics, and general science were astonished to see how widely the marks assigned to twelve of the forty-five freshmen varied in these three subjects. To find an explanation these teachers secured information concerning each pupil's previous contact with the subject matter of these courses and found that the differences in the amount of such contact were in each case explained by differences in home environment. In the following outline of five of these cases, the letter above the statement indicates the pupil's mark in the particular subject for this first marking period of the year.

PUPIL	ENGLISH	CIVICS	GENERAL SCIENCE
	A	*D*	*B*
1 Boy	Father a busy librarian. Encouraged to read much and accustomed to hear correct English spoken.	Family discusses literary curiosities rather than current events. No interest.	Reads *Popular Mechanics* and has considerable knowledge about science, but no direct contacts.

PUPIL	ENGLISH	CIVICS	GENERAL SCIENCE
	E (failure)	*D*	*C*
2 Boy	Father a foreman in shoe factory and ward boss in local politics. Incorrect and vulgar speech used at home. No reading above cheap magazines.	In discussing local politics at home, father talks constantly about the evils of the present administration.	Boy has picked up good knowledge of mechanics, uses tools skillfully, and shows most interest in this subject.
	B	*B*	*E*
3 Girl	Father a lawyer. Mother used to teach. Girl has read much but very superficially. "Flighty" in her class work.	Hears current events intelligently discussed at home and reads the papers regularly.	Has never helped with the housework; takes all scientific data for granted. Is bored by work in class.
	D	*D*	*A*
4 Girl	Father is manager of chemical plant, reads nothing but scientific journals, and is very careless in speech.	Family has moved too often to have ever taken interest in community activities. Mother gives time to music.	Girl reads all she can of scientific literature, and does most of the housework. Plans to enter medicine.
	C	*A*	*C*
5 Boy	Father head of a large department store and prominent in business circles. Son expects to "enter politics." No literary interests but average ability.	Boy has "clerked" in the city hall in vacations and done odd jobs (messenger, etc.) at polls during elections. Attends court whenever possible and reads papers daily.	Has tinkered with automobiles and is familiar with the mechanical principles involved. Quite unfamiliar with other matters discussed in class.

Consider the following questions:

1. How much do you think such previous contacts with the subject matter of high-school courses usually

have to do with a pupil's success in such high school subjects as English, civics, and general science? How did home training affect your own success in various subjects in high school? Specify.

2. What effort do you make to diagnose your classes; that is, to find out what each of your pupils knows about the general field of study before you organize the course in detail?

3. Mention some of the more important uses which a teacher can make of such information as the above with respect to the pupils' out-of-school experience. List these possible uses specifically.

C. Data concerning interest in the subject. — To decide how safely a pupil is guided by interest in a certain subject when electing courses in grades 11 and 12, the teachers of chemistry and physics in a large city high school undertook to classify 100 pupils electing these subjects into five groups, the groups being determined with reference to the pupil's interest in the subject before he had studied it. Group I contained pupils who had to sacrifice the chance to graduate with their class in order to take these subjects because of conflict with other subjects required for diploma in their chosen curricula; Group II contained pupils who were planning to teach these subjects after graduation from college and others who planned to enter industrial work where a knowledge of these subjects was considered helpful; Group III contained pupils who needed credits in these subjects for college entrance; Group IV needed the credit for a high-school diploma but did not feel any other responsibility toward the subjects; Group V were admittedly reluctant to take the courses and did so

only because they seemed the least of various evils. At the end of the courses, a year later, the teachers recorded the number of each group which had received each of the marks assigned — A, B, C, D, and E (failure). The teachers then figured out what chances a pupil belonging to any one of these "interest groups" had of obtaining each of the final marks. It was discovered that the chances approximated a normal distribution such as is shown in the table below. This means that those belonging to Group I (reading down the right-hand column under I) had 2 chances in 100 of failing the course, 10 chances in 100 of being marked D, 17 chances of C, 26 chances of B, and 45 chances of A. The chances of the other groups are read in the same way.

Interest Groups

Final Marks	V	IV	III	II	I
E	45	26	17	10	2
D	26	45	26	17	10
C	17	26	45	26	17
B	10	17	26	45	26
A	2	10	17	26	45

Consider the following questions:

1. Suggest how the teachers could use this table in advising pupils who elect their courses in the future.

2. How nearly do you think this table represents the situation in the classes you teach, assuming that you

had some similar means of classifying pupils according to the intensity of their interest in your subject? What evidence have you either to support or to contradict this general tendency?

3. This table may also represent the probable relations which exist between pupils' intelligence and success in your courses, between success in your school subjects and success in the same subjects in college, between success in school and success in business, and between any other such factors that affect a large enough number of pupils equally. How might you use this table to estimate a pupil's chances of succeeding in eleventh-grade English on the basis of his success in tenth-grade English?

4. Do you consider such indications of probability sufficiently definite to be of real help in teaching? Why or why not?

D. Summary. — If you were to combine the three kinds of information illustrated above in *A*, *B*, and *C* (*i.e.* information regarding the pupil's mental ability, his previous knowledge of the subject, and his present interest in it) for each pupil in your classes, how helpful would this information prove in performing the following duties? *Specify clearly in each case what data would prove most useful and how you would use the data.*

1. Selecting subject matter which is not definitely prescribed.

2. Making special assignments to different groups.

3. Locating and removing the causes for poor work.

4. Advising pupils regarding further work in your department.

5. Handling disciplinary cases.

6. Presenting topics in terms of pupils' familiar experience.

7. Leading each pupil to appreciate what value the course may have for him.

Section II: Outline for Class Diagnosis

Most teachers select classroom procedures on the basis of such information concerning individual pupils as they can pick up in the classroom or obtain from a few private conferences. Information obtained in this indirect way is valuable and in some cases more reliable than information obtained directly. It has, however, certain serious drawbacks. For one thing, information obtained indirectly comes too slowly to prevent the wrong start that may serve to antagonize the class or at least cause needless waste of time. It is also probable that the really important facts about each pupil will never reach the teacher from incidental sources. The reserved pupil who has some legitimate reason for his failure to do good work often does his best to conceal it. A further objection to the incidental gathering of facts is that these facts are seldom recorded and therefore can not be interpreted or used by anyone else until they have been learned in the same accidental way. Unless recorded in some systematic manner no teacher can see them in proper perspective nor use them to the best advantage.

Wherever possible, such diagnosis should be made by a competent psychologist with appropriate tests. Yet, since experts in measurement are comparatively scarce in most school systems, no teacher should hesitate to collect such useful data concerning his pupils as he can obtain himself with reasonable ease and economy of

time. Data concerning the following items are useful to every teacher and can readily be secured by the methods indicated.

USEFUL DATA	HOW OBTAINED
A. Special learning abilities	A. By testing the class in various skills which progress in the subject demands.
1. Ability to select important facts in a typical page of the textbook.	1. Give the class a short unit of typical material to study for several minutes in class. Then call for written replies to about ten definite questions based on this material and varying in difficulty. Or give a simple, silent reading test such as Monroe's. This requires five minutes.
2. Ability to remember these important facts.	2. Repeat the test at intervals of a few days each.
3. Ability to understand words.	3. Call for the use and definition of any graded series of words such as is shown in the following section.
4. Ability to use symbols as in foreign language, mathematics, science, stenography, and other subjects to a less extent.	4. List a number of important symbols used in your subject opposite their meanings. Place this key on the board. Then require the class to substitute symbols for the equivalent words in a list of expressions. Record both accuracy and speed.
5. Speed in motor response.	5. Time the class on any simple mechanical operation such as the cancellation test referred to below.

USEFUL DATA	HOW OBTAINED
6. Ability to make correct inferences from data in the given subject.	6. Present any group of unrelated facts in your subject which have a definite meaning when they are related. Allow the class about five minutes in which to write as clearly as they can what this meaning is. Note the differences in ability to discover these relationships between the facts.
7. General mental ability.	7. Give some simple, intelligence test such as the *Terman Group Test of Mental Ability*, but regard the results merely as suggestive in the case of individual pupils.
8. Other abilities perhaps more important in connection with your special subject.	8. By a combination of methods suggested above or by any simple test constructed for the purpose.
B. Personal history and previous experience with the subject matter you teach.	B. By question-blank, private conference, consulting office records, and talks with former teachers.
1. Age, rate of promotion, and previous school records in your subject and related subjects.	1. Consult office records.
2. Pupil's opinion of former teachers in your subject.	2. Private conference.
3. Education of parents.	3. Question-blank or private conference.
4. Father's occupation.	4. Question-blank, if tactfully worded.
5. Health — serious illnesses, sight, hearing, rate of growth, etc.	5. Observation and private conference where necessary.

USEFUL DATA	HOW OBTAINED
6. Nationality of parents.	6. Question-blank.
7. Language used at home.	7. Question-blank.
8. Part-time jobs, travels, etc.	8. Question-blank.
9. Other items which may indicate more directly what previous contacts the pupil may have had with your subject matter in his home environment.	9. A diagnostic test is best. If none such can be obtained, give a short test at the outset of the course on simple facts that the pupils might "happen" to know. A combination of the above methods should cover other items not mentioned.
C. Present interests related to your subject diagnosed by such questions as:	C. By the same general methods as in *B* above.
1. What is your favorite type of reading? — novels, magazine stories, magazine articles, or newspapers.	1. Question-blank of the check-list type.
2. What is your favorite kind of moving picture?	2. Question-blank.
3. How do you spend your Saturdays?	3. Question-blank.
4. What do you intend to do when you leave high school? What sort of work will you do for a living?	4. Question-blank or check-list.
5. What sort of work in this subject appeals to you most? Which of your school subjects do you like best?	5. Question-blank and conference.
6. Have you ever written a poem out of school? Have you ever made anything? Did it work?	6. Question-blank.

USEFUL DATA	HOW OBTAINED
7. Other questions more directly related to useful interests as expressed in hobbies, games, and out-of-school activities.	7. Combination of above methods.

Section III. Diagnosis Demonstrated

To illustrate how such data as these might be secured for this class, you are asked to supply information concerning yourself with regard to items *A*, *B*, and *C* above, as follows:

A. Special learning abilities.

1. *Ability to select important facts in a typical unit of the text material.*

Close the book and write from memory as much as you can of the first paragraph of this chapter to the effect that it is important for the teacher to study his pupils.

2. *Range of vocabulary.* (*From Brown University Psychological Examination, Test B 2.*)

Below you will find a list of twenty-five words arranged approximately in order of difficulty and which are easy enough to be used to test a class in high school. Put a check mark at the left of each word that you know well enough to explain, define, or use accurately in a sentence. When you have finished checking, define and explain on paper the last five that you have checked.

gown	pork	juggler	tolerate	retroactive
scorch	southern	stave	depredation	achromatic
envelope	dungeon	hysterics	frustrate	casuistry
health	ramble	mosaic	flaunt	sudorific
copper	insure	priceless	milksop	shagreen

3. *Rate of learning use of symbols.*

Spend thirty seconds on the Healy or Wells substitution tests. (pp. 331 f.)

4. *Rapidity of motor response.*

Draw a line through as many A's in the Wallin Cancellation Test (p. 333) as you can in one minute.

5. *Ingenuity, ability to draw inferences.*

Solve either one of the following problems:

a. Take six matches or toothpicks and construct four equilateral triangles, using all six sticks.

b. Take an oblong strip of paper with square corners and about 5″ x 1″ in size. This strip has two surfaces and four edges. Join the two ends in such a way that it will have only one surface and one edge. Rolling the strip into a cone will not answer because of the apex and the inside surface.

6. If time serves (35 minutes), take the Terman Group Test of Mental Ability for Grades 7 to 12 (Forms A and B), or other high-school psychological test.

B. Personal history. — (Such questions as will best help to discover previous acquaintance with the subject and the amount of experience in related fields.)

1. How large were the secondary schools which you attended as a pupil and for how many years did you attend each?

2. At what age did you first think seriously of becoming a teacher?

3. What education have you received since leaving the secondary school?

4. What study or studies in college or normal school do you consider to have been most valuable?

5. In what departments in college did you specialize?

6. What academic honors have you received since leaving high school?

7. What subjects have you taught in high school? What grades?

8. In what schools have you taught?

9. What other occupations have you practiced besides teaching?

10. In how many of the different states have you lived for a year or more? How many have you visited? What foreign countries have you visited?

11. What professional training courses have you completed since leaving high school?

12. Mention any personal or professional handicaps which may have interfered with your preparatory work and teaching (*e.g.* poor health, *et al.*)

13. What is your father's vocation?

14. What other vocation should you choose if you did not teach?

C. Present interests. — To discover attitudes toward the course and "lines of least resistance."

1. Offer as specific a reason as you can state for electing this course.

2. Specify as definitely as you can the particular phase of teaching that interests you most.

3. What sort of school (or other) position do you hope eventually to secure?

4. Mention any three novels you have read within the year.

5. What two books on high-school teaching have you found most helpful?

6. What literature in your special field have you read in the past two months?

7. What grades do you prefer to teach? What sections — college, general, or commercial?

8. Would you leave high-school teaching for a college position at the same salary?

9. In what extra-class activities are you interested? Which do you supervise?

D. Summary.

1. Note the range of differences in this class when summaries of the above tests and replies to questions are reported.

2. Note also your position with respect to the group.

3. Are most of your replies and scores similar to those of the majority, or do they vary considerably from those of the majority?

4. List five specific uses which the instructor might make of these data in order to make this course more helpful to you.

Section IV: Specific Application

A. Preparation of material. — Review the outline for class diagnosis in Section II, pp. 48 ff., and work out in detail a procedure which you could use to obtain useful data concerning a particular high-school class in your subject. *Proceed as follows:*

1. Select one or more of the abilities listed in Section II, A, and prepare the test material exactly as you would give it to the class.

2. Select those items of personal history from the list in Section II, B, which you feel to be most useful for the class you are considering and add such other questions as apply particularly to your subject. Then prepare a question-blank which you could use to collect

this information. Frame your questions with care in order to make them perfectly clear to high-school pupils and use diplomacy where necessary to obtain the information you seek.

3. Prepare another question-blank as above, to use in discovering the pupil's major lines of interest as related to your subject. Prepare also such questions as you would use in private conference.

B. Application to class. — If you are now teaching, apply the test and question-blank material you have prepared above to one of your classes and record the results as described below.

1. *Fill out a blank with the following headings in parallel columns. Show rank of each pupil by checking the proper column.*

Pupil's name or number	*Mental test score*			*Subject test score or marks in subject*		
	Low	Aver.	High	Low	Aver.	High
....	....	.....	....	....	....	....
....	....	.....	....	....	....	....

Previous knowledge of subject			*Present interest in subject*		
Low	Aver.	High	Low	Aver.	High
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

(High should include roughly the best quarter of the class; low, the poorest quarter; and average should include the middle half of the class.)

2. *From the data in the table described above, fill in the following tables: —*

TABLE 1

Subject test or school marks

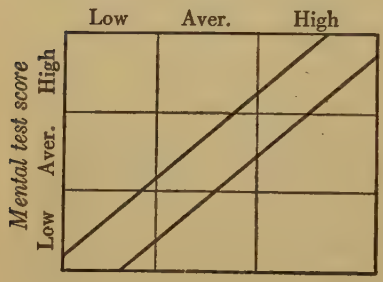


TABLE 2

Present interest in subject

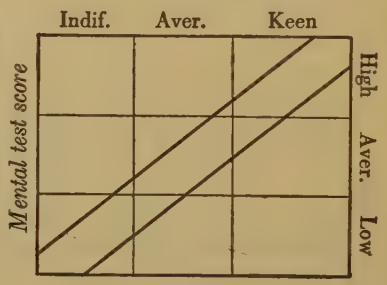


TABLE 3

Previous knowledge of subject

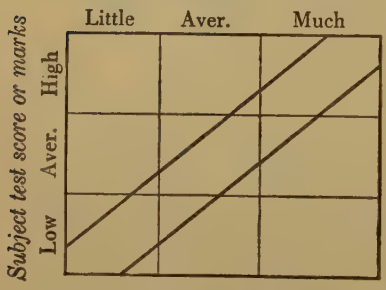
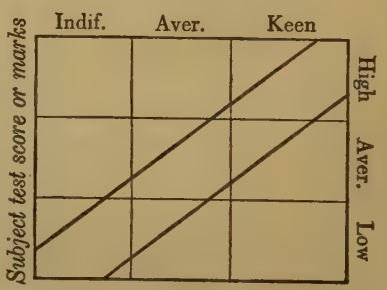


TABLE 4

Present interest in subject



3. *On the basis of these tables answer the following questions:*

a. Are enough pupils working up to their abilities?

b. How does Table 2 explain the number of pupils in Table 1 whose test rank is higher than their rank in school marks?

c. How does Table 3 explain the number of pupils in Table 1 whose test rank is lower than their rank in the school work?

d. How might your conduct of classes better provide for those pupils who express keen interest and yet do poor work?

e. How might you remedy the condition of those pupils who have had most previous contact with the subject and are low in class work?

f. Does this comparison of pupils' characteristics indicate any pupils whose needs you have previously overlooked? Describe such cases as you have found.

g. Did this study suggest any desirable changes in your attitude toward various pupils, your selection of teaching materials, your methods of presenting new material, your supervision of study, relations with parents, outside assignments, or other such activities?

C. Typical Problems. — If you have no class to diagnose, indicate *which of the data* sought by the tests and questions prepared above might be useful in the following situations and *how you would use these data* in finding a solution.

1. *Guidance*

A ninth-grade boy has antagonized two of his six teachers, is doing poor work in all of his subjects, and wishes to leave school so that he can go to work in a store. His parents insist on his finishing school. The boy is sullen and indifferent in class, rarely prepares assignments, and sometimes becomes disorderly.

2. *Selection of Methods*

One fourth of the pupils in one of your classes *seem* unable to follow your explanations when they are given

at a rate which is just right for the remainder. Time does not permit work with the slow group after school.

3. *Selection of Subject Matter*

You are anxious to make your classes appreciate the value of the subject in everyday life, but such outside "projects" as you assign are regarded as more formal than the class work and are left undone.

4. *Discipline*

A girl in one of your classes maintains a sullen attitude which she explains by the often repeated remark — "I knew all this stuff before." She is really bored by explanations to such an extent that she does not do nearly the quality of work she is capable of doing.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).

Chapter XIII summarizes the various uses of tests and measurements in adjusting instruction to individual differences. Applies to all grades.

S. S. Colvin — *Introduction to High School Teaching* (1917).

Chapter II outlines significant psychological principles which determine the interests and abilities of high-school pupils. A well-organized, theoretical discussion.

G. S. Counts — *The Selective Character of American Secondary Education* (1922).

See Contents and Conclusions; shows to what extent pupils of various social levels are represented in the high schools of four typical communities.

C. O. Davis — "Judgments of High-School Pupils about Education," reported in editorial notes of *The School Review*, Vol. XXXII, pp. 402–404.

A list of judgments made by high-school pupils of the North

Central states which help to define the typical pupil's attitude toward the important features of high-school life and classroom instruction.

H. C. Hines — *A Guide to Educational Measurements* (1922).
This is a most useful handbook for the high-school teacher. Chapter XI on Group Intelligence Tests and Chapters XXIII–XXVII on tests in various high-school subjects are pertinent to the problems of the foregoing exercise.

A. J. Inglis — *Principles of Secondary Education* (1917).
Chapters III and IV contain data concerning pupil differences and the high-school population as a whole which form a necessary background to the study of pupil groups.

Irving King — *The High-school Age* (1924).
A nontechnical survey of the significant mental and physical traits of adolescence.

H. L. Miller — *Directing Study* (1922).
Chapter VIII discusses the more prominent factors in pupils' success and failure in high-school classes.

H. W. Nutt — *Principles of Teaching High-School Pupils* (1922).
Chapter V gives a simple and general account of pupil differences and their effects upon the selection of teaching methods.

E. M. Paulu — *Diagnostic Testing and Remedial Teaching* (1924).
The last chapter outlines in general terms the value, method, and use of diagnosis in high-school subjects.

F. B. Pearson — *The High-school Problem* (1916).
Chapter VI of ten pages emphasizes certain outstanding traits of high-school pupils in striking language.

J. W. Slaughter — *The Adolescent* (1911).
Presents the psychology of adolescence in popular form.

E. V. Thomas-Tindal and J. D. Myers — *Junior High School Life* (1924).
The entire book is devoted to the explanation and illustration of specific procedures, programs, and devices that are useful in diagnosis and guidance. Chapter XV, pages 192–281, presents "intra-curricular" activities with real definiteness.

Supplementary References for Individual Selection or Assignment

W. C. Bagley — *The Educative Process* (1905).
Chapter XII summarizes the evidence regarding the effect of different periods of growth upon learning abilities.

F. S. Breed and E. R. Breslich — "Intelligence Tests and the Classification of Pupils," *School Review*, Vol. XXX, pp. 51–66, 210–266 (1922).
Briefly states the more reliable uses to which tests may be put in this connection by the classroom teacher.

C. A. Buckner — "Educational Diagnosis of Individual Pupils," *Teachers College Contributions to Education* No. 98.
Defines a technique in the use of tests for diagnosis.

C. J. Canon — "The Crabbing of Youth by Age," *Atlantic Monthly*, June, 1923, Vol. CXXXI, pp. 787–796.
Sets forth in very readable style the difficulties of the adolescent's relations with his parents.

J. A. Clement — *Curriculum Making in Secondary Schools* (1923).
Chapter V explains the use of intelligence tests, educational measurements, and school marks in the discovery of important pupil needs.

R. Comin — "Teachers' Estimates of the Ability of Pupils," *School and Society*, Vol. III, pp. 67–70.
Offers data concerning the reliability of such estimates.

A. L. Dement — "Values in Extra-curricular Organizations in the High School," *School Review*, Vol. XXXII, pp. 10–18.
Lists the values of particular organizations.

V. E. Dickson — *Mental Tests and the Classroom Teacher* (1923).
Chapters VII and X describe the uses of tests as means of classification, diagnosis, interpretation of other data, curriculum adjustment, and counseling.

A. I. Gates — *Psychology for Students of Education* (1923).
Chapter XVII on the nature of individual differences is perhaps the most pertinent here.

W. H. Hughes — "Providing for Individual Differences with Re-

spect to Instruction, Scope of Work, and Credit," *Educational Administration and Supervision*, October, 1919.

Applies test findings closely to classroom work.

——— "Provisions for Individual Differences in High School Organization and Administration," *Journal of Educational Research*, January, 1922.

Contains a chart to show the frequency with which various provisions occur.

H. C. Link — "What is Intelligence?" *Atlantic Monthly*, Sept. 1923.

Contains an excellent summary of current doctrines in popular form.

W. A. McCall — *How to Measure in Education* (1922).

Chapter III states the requirements of scientific procedure in diagnosing elementary school classes. The presentation is technical.

I. N. Madsen — "The Contribution of Intelligence Tests to Educational Guidance in the High School," *School Review*, XXX, 692–701.

Describes experiments with tests as a basis for guidance.

A. R. Mead — *Learning and Teaching* (1923).

Chapter X is one of the few discussions of measurements which deal directly with subjective estimates by the teacher.

H. C. Morrison — *The Teaching Technique of the Secondary School* (1924).

Chapter VI discusses the question "Can all learn?" and concludes that non-learners are found in all subjects. The evidence supplied can profitably be discussed in terms of the teacher's own classes. Chapter IX presents case-study profiles which are analyzed with reference to appropriate teaching technique.

National Society for Study of Education — *Twenty-first Yearbook* (1922). Part II.

Chapter III on the Administrative Use of Intelligence Tests in the High School by W. S. Miller contains many useful references to classroom procedure. Note especially pp. 205–212 and the full bibliography.

C. W. Odell — "An Annotated Bibliography Dealing with the Classification and Instruction of Pupils to provide for In-

dividual Differences," *University of Illinois Bulletin*, Vol. XXI, No. 3 (1923).

S. R. POWERS — "Intelligence as a Factor in the Election of High-School Subjects," *School Review*, Vol. XXX, pp. 452–455. Indicates relation of test scores to choice of curricula.

R. W. PRINGLE — *Adolescence and High School Problems* (1922). Chapters II to VII outline theories of adolescent development well summarized in pp. 22–39. Chapter VI is perhaps the most significant in that it presents the social characteristics which operate in successful group instruction.

W. M. PROCTOR — *Psychological Tests and Guidance of High School Pupils* (1921). Presents and interprets experimental data.

W. E. STARK — *Every Teacher's Problems* (1922). Chapter VIII contains a series of important problems concerning group teaching in the high school.

E. L. THORNDIKE — *Individuality* (1918). The monograph outlines the author's contribution to the science of pupil diagnosis. This treatment can be supplemented at all points by reference to his *Educational Psychology* and *Principles of Teaching*.

—— *The Psychology of Algebra* (1923). Chapter I organizes the most significant data available concerning changes in the character of pupils entering high school, occupations of high-school graduates, and the intelligence of high-school pupils. This chapter is probably the best treatment of similar character and scope that has appeared.

Additional References to Be Supplied by Instructor

CHAPTER V

MOTIVATION

Assume that the following advertisement has appeared in some educational periodical:

WHAT IS IT?

"Motivation is the most important word in the teacher's vocabulary. Every live high-school teacher is eager to know how to make pupils want to learn. Superintendent Brown's new book, 'Motivation as a Science,' supplies this knowledge for the first time in easily readable form. Every teacher is shown how to apply these truly revolutionary methods to any class. Mr. Brown has demonstrated how class after class of stupid and lazy pupils has been awakened to a real interest in hard work. For example, the application of these simple methods to a slow section of ninth grade algebra in the Fifth Avenue High School of New York City caused this section to outstrip the brightest section of the grade in one month's time. Get the book and read how it was done. Examination copies sent to any address."

Consider the following questions:

1. Would you like to examine this book? Why?
2. To what type of teacher would such an advertisement as this be likely to make the strongest appeal? Why?
3. What type of teacher would such an advertisement serve to exasperate? Why?

4. What type of advertisement would make a stronger appeal to you?

5. Which of the following typical treatments of motivation should you be likely to study with the greatest interest?

a. A series of pen pictures, such as are found in Yeoman's *Shackled Youth,* which present the possibilities of motivation in idealized form but which possess great literary merit.

b. A readable discussion of the principles of motivation illustrated by classroom situations, such as one finds in the various problem-project textbooks.

c. An account of experiments in motivation carefully conducted under normal classroom conditions.

d. An account of experiments in motivation technique conducted scientifically under standardized laboratory conditions.

No matter which of the above treatments appeals to you most, you should note that no one treatment will be studied with most interest by all learners. The student of average ability dislikes oversimplification as much as he dislikes overcomplication. A safe rule in teaching is therefore to begin with the simplest presentation of a topic and then introduce problems which require an increasing amount of thought. By thus gradually increasing the amount of thought required to follow the discussion, the teacher is able to discover the degree of difficulty which challenges the class to its best efforts. It is a mistake to suppose that motivation results from making class work easy. It is essential, however, that the work be definite and that the class have sincere reasons for doing it.

How to supply such reasons — that is, how to make the class want to do the work — is the problem of motivation. The supreme importance of this problem is explained by the fact that it enters into every one of the teacher's activities. The motivating process, therefore, can not be reduced to definite procedures for stated occasions. But useful procedures can be more readily selected when the teacher can distinguish those factors in any class procedure which best stimulate the class response.

For procedures in general at least three such factors are important:

1. The procedure must secure as *much* response as possible from a large majority of the pupils.
2. The procedure must secure this response as *economically* as possible; that is, it should require no *unnecessary* effort on the part of the teacher.
3. The procedure must secure as *useful* response as possible; that is, the response must have a real educational value for the pupils.

Each of these three factors and their corresponding effects — amount, economy, and usefulness of response — is somewhat easy to obtain by itself. Superlative skill in teaching is required to obtain all three at the same time. It accordingly follows that to acquire skill in motivation the teacher may well begin by producing these effects separately. He should then become able to use some procedures so as to produce all three of these effects at once to some extent. The remainder of this chapter is intended to suggest certain methods of producing these effects separately and to afford some

practice in working out motivating procedures for actual classroom use.

Section I: Amount of Response

There is no limit to the amount of response a teacher can obtain from any class — if considerations of economy and usefulness are ignored. He might devote the class period to a boxing tournament or sensational moving picture show and hold each pupil's interest at white heat. The important fact to be noted is that mere *amount* of response is most easily secured by some sort of entertainment — by any sort of situation, that is, which appeals to strong emotions and requires little effort of thought. Such entertainment is sometimes justified if it creates a more favorable attitude toward the teacher and the work of the course, whether the immediate response is purposeless or not. But those procedures which bring about a sufficient amount of activity serve the purpose of motivation best when they give this activity some useful direction. Cheap devices can attract interest but usually fail to hold it.

Illustrating amount of response. — The following passage from a novel describes a teaching procedure which provides entertainment on the highest level the class is able to reach:

"The boys trooped out at David's summons, peeling off their coats, and grouped themselves in the shade of the four big elms that stood in a quadrilateral clump at the edge of the field. The Head had taken off his coat, and, leaning on his elbow, lay on that part of his person which in ordinary mortals is called the stomach, with a book or two in front of him.

"'All comfortably settled?' he said. 'That's all right. Now to-day I'm going to talk to you about a man whom very likely you have never heard of, and read you something he wrote. His name was Keats, John Keats. Has anybody heard of him?'

"Nobody had.

"'He was a chemist's assistant,' said the Head, 'and if some ninety or a hundred years ago, you, Stone, or you, Blaize, had gone into a doctor's little dispensary near Hempstead to get a dose because you had a pain in your inside, from eating too many strawberries, or from having shirked into Richmond and devoured more than a sufficiency of Maids of Honour, you might have had your medicine given you by one of the greatest lyrical poets who ever lived. The doctor's assistant, a pale young man with a bad cough, might perhaps have mixed it for you, and if you were wide awake you might have seen that when he got up to give you your pill or your powder, he laid down a pencil and a piece of paper on which he was scribbling. Stone, if you leave that wasp alone he will not get angry and sting you, or lose his head and think it was me who was annoying him. Yes, and then when you had paid your twopence and gone away with your pill, you may be sure he would have taken up his pencil and paper again. No doubt, if you had asked him, he would have copied out for you what he was writing on another piece of paper, in which he was accustomed to wrap up parcels, and wondered that you cared to pay another twopence for it. But if you sold that piece of paper to-day you would get, not twopence, but hundreds of pounds for it. For on it would be written lines by John Keats, in his own hand. And

what you might have found on that piece of paper is this: —

> " 'My heart aches, and a drowsy numbness pains
> My sense, as though of hemlock I had drunk,
> Or emptied some dull opiate to the drains
> A minute since, and Lethe-wards have sunk.'

"Lethe we had in our Homer not long ago. Lethe, the water of forgetfulness. Sometimes I think Blaize and others of you have drunk it.

> " " 'Tis not through envy of thy happy lot,
> But being too happy in thy happiness
> That thou, light-winged dryad of the trees
> In some melodious plot
> Of beechen green, and shadows numberless,
> Dreamest of summer in full-throated ease.'

"He read on, occasionally stopping to explain a word; once and again his voice trembled, as it did sometimes when he preached; once it nearly stopped altogether as he came to the lines:

> " 'Perhaps the self-same song that found a path
> Through the sad heart of Ruth, when, sick for home,
> She stood in tears amid the alien corn.'

" 'In tears amid the alien corn,' he repeated.

"They were all sitting or lying about at ease on the grass, one or two of them listening intently, the others, for the most part, feeling just lazy and soothed and comfortable. But among the intent listeners was David, and as the Head paused and repeated 'alien corn,' he rolled over on to his back, absorbed and lost.

" 'Golly,' he said quietly to himself. 'Oh Golly!' Then he became aware that he had spoken aloud, but scarcely wondered whether the Head had heard or not, so completely did the magic of the words possess him. And in some mysterious way they added to his store of happiness; they became part of him, and thus part of the fact that he was going to Marchester next week, and would see Hughes, and that there was a half holiday this afternoon, that he was in the eleven. Keats' poem was part of the whole joy of life, it, and its music, and the sense of longing for something he did not know about, which it produced in him.

"The Head finished the ode, and invited questions. Stone wanted to know what Hippocrene was, thinking this an intelligent question, but Ferrer's inquiry as to what the 'magic casements' were earned stronger approbation from the Head, who mysteriously told him that no one could tell till they looked out on to the 'perilous seas.' It was not like the 'Commentaries' of Julius Caesar, this which he had read to them, because it could mean different things to different people. Each sentence of the 'Commentaries' meant one thing, and it was the business of boys to find out, with the aid of a dictionary, what it was. But music and poetry were altogether different; they meant to you what you were capable of finding in them. Then he turned to David, who alone of the class had not asked any questions, intelligent or otherwise.

" 'Nothing you want to know, Blaize?' " he asked.

" 'No, thank you, sir,' said David. 'But would you read it to us again, sir, as you do sometimes?'

"The Head sat up, clasping his knees with his arms,

and without answering David began the ode again in that extraordinary voice of his, this time not looking at his book. He began in tones so low that it needed an effort to hear him; it boomed out over 'charioted by Bacchus and his pards'; it sounded like a breeze at night in the stanza 'I cannot see what flowers are at my feet'; again it shook with emotion over the 'sad heart of Ruth,' and David felt a lump rise in his throat, a mysteriously blissful misery took possession of him. And when the Head finished he found himself smiling at him with mouth that trembled a little.

"There was silence a moment.

" 'That will do for the day,' said the Head. 'You can go.'

"The group rose from the grass with alacrity, for though Keats was all very well, an extra half-hour at the bathing place, for the lesson had been very short, was even better. But in spite of the permission David lingered.

" 'Did he write much else, sir?' he said. The Head handed him the volume. 'You may see for yourself,' he said. 'Give it back when you've finished with it.' "[1]

Criticism:

A few devices commonly used to increase the amount of class response are listed below. Check such of these devices as are used by the teacher in the situation described above. Then underline those you use yourself with some regularity, or those you believe to be in general most effective. Select about five of those you have

[1] E. F. Benson, *David Blaize*, Hoddor, Stoughton, 1916, pp. 90 ff. Quoted by permission of the author and of the publishers.

underlined and write out in detail how you would apply each device to some concrete situation you have observed in a high-school class.

Humorous remarks — as in appropriate anecdotes, good-natured irony, and other pleasantries.

Competitions — among individuals to meet a set standard, among groups in the class to see which can do most of certain problems assigned or which can do an assignment most rapidly, or among various classes in the same subject.

Dramatic illustrations — as when the teacher reads to the class with real expression or relates some incident connected with the class work in such a way as to make a vivid impression.

Experiments — either in class or out as a means of arousing curiosity and interest in the class work.

Rapid questioning and speed tests — as in drill exercises and as a means of "warming up" for work requiring serious thought.

Personal appeals and appeals to school spirit — to class spirit and other loyalties. Such appeals are seldom effective unless made *indirectly*. For example, the request "Do this for my sake" is more likely to kill response then increase it.

Sudden raising, lowering, or change in tone of voice — as an effective means of attracting the attention of each pupil to what is being said.

Class excursions — when conveniently arranged and systematically conducted, such visits to theaters, workshops, and the like to demonstrate the importance of material studied in class often greatly increase the amount of class response.

Striking and novel illustrations — stories, pictures, objects, and a variety of specific instances are essential means of motivating the study of abstract principles in any subject.

Section II: Economy of the Teacher's Effort

The publicity given to novel and somewhat elaborate devices for obtaining response often obscures the fact that most of the class response results from habit. Some of the devices listed above require much more of the

teacher's effort than others, and some fail to take effect if used too frequently. The latter should accordingly be reserved for special occasions, if only to economize the teacher's effort. Routine responses are most economical. When the more essential group activities of a class — such as attendance, preparation of assignments, etc. — have become fixed habits, the teacher can devote much time to real teaching that must otherwise be given to class management.

Illustrating the need of economy of effort. — Consider the economy implied in the following description of a class in an English public school:

"Mr. Dumaresq was reputed to be the hardest slave-driver in Eaglescliffe. His eyes were cold and china-blue, and his voice was like the neighing of a war horse. He disapproved of the system of locked form-rooms — it wasted at least forty seconds, he said, getting the boys in — so he made his head boy keep the key and open the door the moment the clock struck.

"Consequently, when upon this particular morning Mr. Dumaresq stormed into his room, every boy was sitting at his desk.

" 'Greek prose scraps!' he roared, while still ten yards from the door.

"Instantly each boy seized a sheet of school paper, and having torn it into four pieces selected one of the pieces and waited, pen in hand.

" 'If you do this,' announced Mr. Dumaresq truculently, as he swung into the doorway, 'you will be wise.'

"Every boy began to scribble madly.

" 'If you do not do this', continued Mr. Dumaresq, 'you will not be wise. If you were to do this you would

be wise. If you were not to do this you would not be wise. If you had done this you would have been wise. If you had not done this you would not have been wise. Collect!'

"The head boy sprang to his feet, and feverishly dragging the scraps from under the hands of his panting colleagues, laid them on the master's desk. Like lightning Mr. Dumaresq looked them over.

" 'Seven of you still ignorant of the construction of the simplest conditional sentence!' he bellowed. 'Come in this afternoon!'

"He tossed the papers back to the head boy. Seven of them bore blue crosses, indicating an error. There may have been more than one mistake in the paper, but one was always enough for Mr. Dumaresq.

" 'Now sit close!' he commanded.

" 'Sitting close' meant leaving comparatively comfortable and secluded desks, and crowding in a congested mass around the blackboard, in such wise that no eye could rove or mouth gape without instant detection.

" 'Viva voce Latin Elegiacs!' announced Mr. Dumaresq with enormous enthusiasm. He declaimed the opening couplet of an English lyric. 'Now throw that into Latin form. Adamson. I'm speaking to YOU! Don't sit mooning there, gaper. Think! Think!'

" 'Come, lasses and lads, get leave of your dads — Come on, man, come on!

" '— And away to the maypole, hey!'

" 'Say something! Wake up! How are you going to get over "maypole"! No maypoles in Rome. Tell him, somebody! "Saturnalia" — not bad. (Crabtree, stand up

on the bench, and look at me, not your boots.) Why won't "Saturnalia" do? Will it scan? *Think!* Come along, come *along.*'

"In this fashion he hounded his dazed pupils through couplet after couplet, until the task was finished. Then, dashing at the blackboard, he obliterated the result of an hour's labour with a sweep of the duster.

" 'Now go to your desks and write out a fair copy,' he roared savagely.

"So effective were Mr. Dumaresq's methods of inculcation that eighteen out of his thirty boys succeeded in producing flawless fair copies. The residue were ferociously bidden to an 'extra' after dinner. Mr. Dumaresq's 'extras' were famous. He held one at least every day, not infrequently for the whole form. He possessed the one priceless attribute of the teacher: he never spared himself. Other masters would set impositions or give a boy the lesson to write out. Dumaresq, denying himself cricket or squash, would come into his form room and wrestle with perspiring defaulters all during a hot afternoon until the task was well and truly done. Boys learned more from him in one term than from any other master in a year; but their days were but labour and sorrow." [1]

Criticism:

A. Check such of the following class activities as seem to have become habitual in the class described above and suggest briefly by what methods you suppose the teacher has made each one habitual:

1. Taking seats promptly.

[1] Ian Hay, *The Lighter Side of School Life*, Houghton Mifflin, 1920, pp. 55–58. Quoted by permission of the publishers.

2. Making class papers conform to standard in size, form, etc.
3. Beginning the class work with full attention.
4. Concentration of effort upon class exercises.
5. Passing papers efficiently.
6. Prompt oral recitation.
7. Feeling responsible for entire work of the period.
8. Thorough preparation of outside assignments.

B. List such of the above activities as you believe can not advantageously be reduced to fixed habits in an American high-school class by the methods here employed. Outline clearly such other means as you have employed to make habitual those activities which you think should be made habitual — or describe such other means as you may have seen employed effectively.

Section III: Usefulness of Response

The usefulness of devices for obtaining amount and economy of response is mainly indirect since these effects are not *in themselves* of educational value. Amount and economy of response are only worth obtaining when the response itself is useful to the pupils concerned. Generally speaking, the usefulness of response depends upon the connection between the work of the course and the accomplishment of results that the class considers worth accomplishing. The closer this connection, the more useful the class response is likely to be. The most useful motivating devices are accordingly those which serve to harmonize the *aims* of the teacher and the *aims* of the class. One procedure which accomplished this result can be taken as illustrative.

Illustrating usefulness of response. — The following excerpt contains the teacher's statement regarding her plan at the outset of the course:

COURSE IN PHYSIOLOGY AND HYGIENE

"The schedule in physiology, like that of other studies, had been mapped out long ahead *for* the students, not by or with them as democracy would suggest. Our purpose was to cover the ground prescribed — a necessary precaution in order to disarm criticism — and in addition to make the classroom, as far as possible, a center of genuine pulsating life. As to subject matter, there should, according to our plan, be drawn into this extended course whatever of current interest to the community could be utilized. As regards human relationships, these should be socialized.

"Enter the (seventeen) girls, for the most part in twos or threes, chatting in the usual fashion. They stand until the last minute, then, still talking, slip into the chairs which are arranged in a circle.

"A bell buzzes. The teacher directs the attention of the now politely silent class to the printed course of study for the year. It is made out in the form of topics. The so-called 'Outlines,' representing 'What every student ought to know,' have long since been mapped out by the teachers in conference and approved by higher authorities. They are spoken of as the 'Required Work.'

"How to use the outlines in connection with the textbook is explained at some length by the teacher. One of the topics is designated to be studied and recited in the usual way at the next lesson.

"*Teacher* (who has set forth, in what she considers an attractive light, the value in daily life of the study of physiology and hygiene.) 'Now you may have a little while each week — half an hour to start with — in which to do any work you are particularly interested in.'

"(Class sits in respectful silence.)

"*Teacher.* 'Why not think the matter over? I am sure that when you studied this subject before, there were — there must have been — a great many things that you wanted to know, which, of course, there wasn't time for. Talk it over among yourselves. Tell us about them next time. . . .'

"The weeks flew by. It was now November. Everybody had chosen something to present to the class. Some of the subjects were ambitious, others were relatively unimportant. They represented the extremes and every grade between, and ranged from the careful presentation of such a topic as 'The Germ Theory of Disease' to the mere bringing in of a magazine clipping on 'Fresh Air.' A few students had contributed several times. The class discussions were becoming surprisingly free and frank. The teacher reserved her opinion until it was actually called for . . .

"In the meanwhile the class had organized and its business went like clock work. A chairman and secretary had been elected. Members, when speaking, addressed the chair. The procedure was dignified. The feeling of satisfaction was daily growing deeper. Thus the first milestone in coöperative work had been reached.

". . .Viewed from the point of intellectual accomplishment, the class work had now begun to gain greatly.

It became more thorough, more accurate, more liberal in scope. Questions — always the severest test of scholarship — were invited. An attempt was made to clear up every doubt. The results, as shown in oral and written reports (now required by the leaders so as to dispel any illusion that their aim was to please rather than to instruct), were strikingly satisfactory. . . ."

Criticism:

Criticize the amount, economy, and usefulness of the motivation described in the above account. (When possible read the entire chapter from which these passages have been quoted.)[1]

Section IV: Specific Application

A. Motivating selected activities. — Read the list of pupil activities below. Select three or more of these activities to which you find it most difficult to make one of your classes respond, or to which you think you would have trouble in getting response. Describe the class situation in detail. Then outline in detail such procedure as you might employ to motivate better response to the three activities selected.

1. Memorizing the essential definitions, outlines, and rules.
2. Making sincere appreciations of literary passages, historical movements, scientific and mathematical laws, and the like.
3. Solving problems both in and out of class.
4. Performing drill exercises accurately.

[1] C. H. Johnston, *The Modern High School*, Scribners, 1913, Ch. IX. Quoted by permission of the publishers.

5. Voluntary outside reading.
6. Speaking correct English in class.
7. Developing efficient study habits.
8. Organizing written work clearly and logically.

B. Use of selected devices. — Several types of motivating device are listed below. Most of these can be usefully employed at times in the teaching of any high-school subject. Describe one or more definite class activities in which the response is poor in one of the courses you teach or have observed. Select three or more of the devices listed below which you think most likely to improve this response. Then state in detail how you would apply each device selected to that course at the present time. Be careful to indicate exactly what material the class is studying and how your own procedure will apply to that material. Cover all points in your procedures which would have to be covered before a teacher could use them successfully.

1. Adapting work of the course to local situations, current events, or familiar experiences.
2. Adapting work of the course to individuals' vocational interests.
3. Allowing time for "voluntary work," in addition to regular assignments.
4. Arousing curiosity in the outcome of experiments, readings, etc., which form a part of the course.
5. Solving case-problems or project-problems which involve principles discussed in the text material.
6. Competition between groups in drill work, problem assignments, and other class activities.
7. Granting special privileges to pupils who do superior work.

8. "Socializing the recitation," *i.e.* letting the group plan the work.

9. Making individual assignments on the basis of interests and abilities.

10. Appointing best pupils as teachers' assistants.

11. Organizing honorary clubs in your department to which election depends upon work of a certain quality, or upon the completion of certain requirements — preparing a paper, planning a project, and the like.

12. Demonstrations before the class by such clubs or by informally selected groups.

13. Daily written speed tests or rapid-fire questioning.

14. Arousing individual competition by posting charts to show each pupil's position in the class as determined by standardized or other tests.

15. Informal discussion of topics in which pupils happen to be particularly interested at the time.

Section V: Procedures Criticized

Criticize the motivation in the entire chapter by brief replies to the following questions:

1. Does the chapter as a whole require you to *do* enough — that is, to perform a *sufficient amount* of activity to prevent your attitude from being passive or indifferent?

2. If so, by what means was this activity produced? Consider the three means suggested below and list them in the order of their effect upon you.

a. By appeals to your feelings, as in certain of the selections quoted, which call for the expression of interests that have no direct bearing on the work of this course —

b. By relying upon certain of your habits which lead you to coöperate in the activities of a professional course —

c. By appeals to your common sense, as in the problems proposed for solution, which challenge your ability to meet new situations successfully, to compete with the other members of the class, and the like.

3. Does the chapter call for more effort on the part of the teacher than the results in your case seem to justify?

4. To what extent do you regard the work you are asked to do in this chapter as worth doing, from the standpoint of its use in helping you to motivate a class?

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).

Pages 53–64 and top of page 90 emphasize the objective phases of motivating procedures.

S. S. Colvin — *Introduction to High School Teaching* (1917).

Chapter VII states the causes of inefficient class management and their remedies. Indicates the effect of efficient class management upon the class response. See bibliography for Chapter IV, pp. 388 f.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).

Pages 47–9 explain the value of the problem as a factor in motivation.

H. G. Lull and H. B. Wilson — *Redirection of High-School Instruction* (1921).

Chapter IV illustrates several useful motivating procedures in terms of projects in the junior high-school grades.

H. L. Miller — *Directing Study* (1922).
Chapter V deals with "The Development of the Work Spirit" and offers various helpful suggestions concerning use of the classroom exercise as a means of motivation.

F. B. Pearson — *The High-school Problem* (1916).
Chapter XVIII gives a simply written summary of essential factors in motivation.

W. E. Stark — *Every Teacher's Problems* (1922).
Chapter VII presents a series of problems for the reader's solution involving essential procedures in motivation.

Supplementary References for Individual Selection or Assignment

J. Adams — *Exposition and Illustration in Teaching* (1915).
Contains a wealth of suggestion toward the enrichment of class work by means of ingenious and stimulating illustration.

—— *Modern Developments in Educational Practice* (1923).
Chapter IX criticizes the principle of free discipline.

—— *The New Teaching* (1917).
The fourteen chapters are each concerned with a separate subject and describe procedures for vitalizing instruction in these subjects from the standpoint of practice in English schools.

W. W. Charters and H. G. Paul — "Games and Other Devices for Improving Pupils' English," Bureau of Education *Bulletin*, No. 43 (1923).
The study contains suggestive devices for use in connection with various types of high-school instruction.

S. S. Colvin — *The Learning Process* (1911).
Chapter XIX discusses "Pedagogical Applications of the Doctrine of Attention" and presents the psychological basis for standard procedures in motivation.

J. and E. Dewey — *Schools of Tomorrow* (1915).
The book describes various schools, mostly elementary, which aim to motivate school work by relating it to the natural interests of the pupils.

J. Dewey — *Interest and Effort in Education* (1913).
This presents the essential principles of psychology which underlie the proper selection of motivating procedures.

A. I. Gates — *Psychology for Students of Education* (1923).
Chapters VII, VIII, and IX deal respectively with instinctive impulses and activities, the emotions, and the dynamic rôle of instincts in habit formation. These chapters emphasize the instinctive elements in pupil responses to classroom motivation.

C. H. Johnston — *The Modern High School* (1914).
Chapter IX contains an account of the methods employed to relate a course in physiology more closely to pupils' interests. Chapter XIV discusses pupil participation in school government as a means of increasing interest in studies and in the life of the school generally.

W. H. Kilpatrick — "The Project Method," *Teachers College Record*, Vol. XIX, pp. 319–335, September (1918).
This monograph states the theoretical basis for the project method as a motivating device.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter XIV discusses "Interests, the Basis of Economy in Learning," and thereby provides a useful analysis of motivating procedures. Pages 177–187 of the companion book of exercises by the same author apply this analysis to class situations.

W. C. Reudiger — *Vitalized Teaching* (1923).
The first section of the monograph offers many good suggestions as to means of avoiding verbalism in teaching.

J. K. Van Denburg — *The Junior High School Idea* (1922).
Chapter XIV discusses the importance and practicability of supplying pupils with real motives for the performance of school work.

The following general bibliographies on the project method should be consulted for procedures which may serve to motivate high-school courses in which the project method as such is rarely if ever used.

J. P. Herring — "Bibliography of the Project Method," *Teachers College Record*, Vol. XXI, pp. 150–174, March, 1920.

R. E. Herrold — "Bibliography of the Project Method," *General Science Quarterly*, Vol IV, pp. 283–291, November (1919).

U. S. Bureau of Education, Library Division, *Library Leaflet* 17, February (1923).

Twentieth Yearbook, National Society for the Study of Education, Part I, pp. 191–220.

Additional References to Be Supplied by Instructor:

CHAPTER VI

DISCIPLINE

Several facts combine to make discussions of school discipline both interesting and inconclusive. (1) The scope of the topic is so wide as to include all problems of teaching and class-management to some extent. (2) The psychological advantages of controlling pupils by suggestion rather than by authority are easy to recognize, but comparatively few teachers are endowed with sufficient powers of leadership to rule entirely by force of suggestion in the public high school. (3) Much confusion results from the tendency to regard discipline both positively as character-training and also negatively as the prevention of disorder. Procedures effective in one of these directions are sometimes ineffective in the other. (4) Acute problems of discipline arise only in abnormal situations. Hence effective remedies can not be readily standardized.

In spite of these facts it is possible to apply certain well-established principles to those situations which, under certain conditions, are likely to arise in any normal class. The four items above may serve as bases for discussion.

Section I: To What Sort of Situation Does the Term "Discipline" Properly Apply?

It is perhaps helpful to think of "discipline" as complementary to "motivation." The two factors balance

in the conduct of the average class. For the highly resourceful teacher, motivation renders discipline unnecessary. For the purely mechanical teacher, discipline takes the place of motivation. Thus while a few pupils may cause disorder in a well-taught class, good teaching is the best guarantee of good discipline. A pupil is always attending to something. The teacher's business is to make the class work more attractive than other things he might attend to. But the best teachers do not teach well every day, and other factors somewhat beyond the teacher's control combine to make disciplinary action imperative at certain times.

In the following discussion we may, therefore, define "disciplinary action" as applying exclusively to those *situations in which the teacher makes a conscious effort to check or prevent class disorder.* Test this tentative definition by replies to the following questions:

1. How frequently do you have the feeling as you teach or as you observe, that the class is not being "held" by interest in the class work alone? Usually? Frequently? Or seldom?

2. On the basis of the above definition, which of the following factors in teaching have you used or seen used for disciplinary purposes: assignments, questions, drill work, testing, marks, change of subject, review?

Section II: How Much Authority Should the Teacher Exercise?

"There is one story in particular that has a specially fascinating effect on the practical schoolmaster when it is quoted, as it invariably is in all discussions on free

discipline. A certain bad boy when faced with this charter of liberty of action without penal consequences showed his independence by smashing a vase that somehow happened to be handy. But when the master offered his watch as the second sacrifice (I wanted to say *gold* watch, but I must keep to the text of the story) 'the boy turned white, trembled from head to foot, and said he *could* not.' Several practical teachers to whom I have mentioned this recorded incident have reacted in a precisely uniform way. Each looked startled, pulled out his watch, gazed at it anxiously, and replaced it in silent skepticism."[1]

Assuming this incident to have occurred as described, reply briefly to the following questions:

1. Do you consider the teacher's procedure justified in this particular case? Why?
2. To what extent was the boy justified in smashing the vase?
3. Do you think that this experience tended to prevent this boy from creating further disturbance as effectively as stricter regulations might have done? Why?
4. How do you think the boy would have responded if *you* had offered him the watch? Would he have giggled?
5. It is said that "the real value of free discipline is that the pupils have a chance to go wrong in their own way, to make their own mistakes, and to find the way to remedy them on their own account." Do you think such freedom would make a ninth-grade class in a trade

[1] John Adams, *Modern Developments in Educational Practice*, Harcourt, Brace, p. 292. Quoted by permission of the publishers.

school more orderly in the long run than would less freedom? Why?

6. How far do you approve of "free discipline" as conducted by Angelo Patri and other exceptionally skillful teachers? As recommended for general adoption in high school? What has the pupil's home training to do with it?

7. In class work it appears that best results follow when each pupil is given as much responsibility as he can bear. To what extent, if any, does this apply in matters of discipline?

8. State as plainly as you can a principle by which you might determine how much responsibility a teacher should delegate to a class of normal docility.

Section III: To What Extent May Discipline Provide for Character-training?

To persons inclined to regard school discipline as largely a matter of ethics or to regard it exclusively from the individual pupil's point of view, the above question may well appear absurd. In the popular mind, discipline and character-training are identical; that is, the primary purpose of disciplinary regulations is considered to be the training of character. Experienced teachers will note at least three objections to this position: First — Order must be secured before training in character, in Latin, or in anything else is possible; Second — "Perfect discipline," in the sense of perfect order, is, if anything, likely to provide less opportunity for the best kind of character-training than a reasonable amount of disorder; and, Third — effective character-

training, like effective teaching of other sorts, must rely mainly on motivation and employ disciplinary measures only when motivation fails to preserve order. Each of these objections may be illustrated as follows:

A. Discipline weak and character-training poor. — The writer observed a ninth-grade class in music which was conducted by a very capable teacher from another school in the absence of the regular teacher. The class exercise consisted in listening to phonograph productions of operatic airs; solos by McCormack, Kreisler, and Gluck; male quartet selections, and some lively band music, which the class was expected to compare in various respects. From the outset of the period the class had the teacher on the defensive. As the first record was played, a low humming of the air soon developed into a roar, which continued in spite of the teacher's protests. Stopping the machine was the signal for a banging of desk covers, throwing of chalk, and remarks that were intended to be insulting. The situation was entirely beyond the teacher's control for the time being. The principal was summoned, three pupils were dismissed for corporal punishment, and order was restored. The teacher's comment was, "They didn't give the music a chance."

Reply briefly to the following questions:

1. What opportunities for character-training did the class exercise provide as the teacher had *planned* to conduct it?
2. Which of these opportunities would have been realized if the principal had not come to the rescue?
3. Do you think that the total effect of this period

upon this class would probably tend to encourage or discourage a repetition of this performance?

4. Do you consider the character-training resulting from this experience to have been good or bad for the class as a whole? For the three pupils punished? For the few orderly pupils in the class?

5. Criticize the following generalization: Order must be established, by force if necessary, before character-training can be attempted.

B. Discipline good and character-training poor. — Adams describes a situation in which for various reasons 120 boys were left one morning without a teacher. An old sergeant, who was employed as janitor, learned of the fact, "dashed upstairs, sprang upon the little platform, and *glared*. There was dead silence: but nothing else happened. The glaring continued for eighty minutes, till the headmaster returned, but that was all that went on." Adams also quotes the following: "Countless men have I known who are rapidly making names for themselves as successful schoolmasters, who under any sane system of education would have been sacked after their first day; men who have this wonderful gift of being able to keep boys in order, but beyond it nothing, nothing at all — they would fail even as policemen. They have no powers of direction; they can only hold their hands up and keep the traffic at bay. Successful schoolmasters, indeed!" [1]

Consider the following questions:

1. Do you think situations of the sort described occur frequently enough in high-school teaching to be really

[1] John Adams, *Modern Developments in Educational Practice*, Harcourt, Brace, p. 281. Quoted by permission of the publishers.

significant? How many teachers have you known whose only qualification was their ability to keep order?

2. What sort of character-training do you think the sergeant's glaring probably afforded?

3. An educational book, J. Lee's *Play in Education*, contains a chapter entitled "The moral necessity of disobedience." How far does this idea apply to high-school pupils?

4. What importance do you attach to the quality of passive obedience as a character trait?

5. What other traits that are expected to develop under disciplinary regulations do you find more important?

C. A test case. — An unusually talented girl of sixteen was transferred from a fashionable girls' boarding school to the tenth grade of a large cosmopolitan high school. In the boarding school her contacts with girls from well-educated families like her own had developed very pleasant manners and considerable social poise. She had worked hard at her studies but rather from a sense of duty than from any real interest in the subjects. At the end of the first half year in the high school these conditions were almost reversed. She was leading her classes in mathematics and science and stood near the top in all her other subjects. Her originality and initiative in class work were conspicuous. Her deportment, however, had changed for the worse. While not openly discourteous, she was rapidly acquiring the careless speech and manners of pupils from homes less cultured than her own, and her familiarities with boys in the science laboratory classes were causing the teacher serious concern. She had spoken to the girl several times about the matter but no results were apparent.

Consider the following questions:

1. Do you consider this change in schools to have been beneficial or otherwise for this pupil, all things considered?
2. Should the science teacher approach the girl further from the standpoint of discipline at the risk of destroying her interest in the course? If so, how?
3. Do you consider character-training or the prevention of disorder to be the more justifiable purpose of disciplinary measures in a public high school?
4. To what agencies in the public school should one look for guidance and character-training if not to disciplinary regulation as here defined?

Section IV: Procedures Effective in Typical Situations

Frequent causes for school offenses are listed by Morehouse [1] as follows:

"1. Physical or mental energy not used or properly directed.

2. Resentful resistance to control which pupils do not understand or accept.

3. A faulty physical environment or peculiarities in the physical condition of pupils.

4. The lack of training in morals and manners, and false ideals which pass current in society.

5. Desire to attract attention and create a sensation.

6. Imitation of other pupils, usually older.

7. Lack of culture."

Note that for the first three of these causes the teacher

[1] Frances Morehouse, *The Discipline of the School*, Heath, 1915, p. 162. Quoted by permission of the publishers.

is largely responsible. When recognized in time, these can be removed by somewhat obvious procedures that apply to the class as a whole. The last four may also be removed at times to the extent of preventing disorder; or again they may lead to offenses more or less serious which deserve punishment. This rough grouping suggests that disciplinary procedures may be classified as follows: (*a*) *preventive, for the class as a whole,* (*b*) *preventive, for individual pupils,* (*c*) *punitive, for individual pupils.* A brief inventory of these procedures will be followed by a series of situations to which the procedures may be applied.

A. Procedures to prevent general disorder from causes 1, 2, and 3. — 1. Boredom may result in any kind of disorder from shuffling of feet and window gazing to deliberate challenge of the teacher's authority. For this a safe prescription might be — direct the surplus energy to useful ends by introducing some activity that is novel, that is neither too easy nor too difficult, and that involves group competition; for example, a written test that is self-scoring, an oral test by rapid-fire questions, a discussion of some congenial and nonacademic topic between groups, reading of a humorous nature that gives a giggling, restless class something to laugh at, or a well-constructed written exercise. The maxim applying here is, of course, *Keep everyone busy.*

2. Resentment at seemingly arbitrary restrictions is the common source of malicious disorder which may take any form that the class is ingenious enough to devise. Prevention demands that a constant effort be made from the outset of a course to stimulate group responsibility for the accomplishment of class work.

Organized coöperation prevents organized revolt. Some teachers find it helpful to place this responsibility upon duly elected class officers who are frequently chosen from among the more unruly members of a class. If reasons for all necessary restrictions are advanced when the class is in the mood to appreciate them, disorder from this cause alone is prevented. The same reasons will be repudiated if advanced when the class is in the mood to "start something." Relate class behavior to school spirit and social custom, by implication rather than preachment, and show definite cause for each regulation you adopt. Adoption by vote of the class, where such votes are not engineered by the teacher, has obvious advantages.

3. Such physical conditions as light, heat, ventilation, seating arrangements, preventable noises from outside, and curtained windows are always important. The physical conditions of individual pupils should be diagnosed as a matter of course from their responses at the beginning of the period.

B. Procedures to prevent individual disorder from causes 4, 6, 7, and 5. — Notions to the effect that cheating is clever and legitimate if undetected, that the refusal to give dishonest help is unsportsmanlike, that sex allusions indicate maturity, and other evidences of poor home and "gang" environment are best handled in conference as a general rule. Such conferences should be infrequent and very carefully planned. When immediate action is imperative, a sharp rebuke or dismissal from the class should be followed by a conference in which the teacher takes the attitude that the pupil does not know any better but would like to learn. When the social bearings of his behavior have been clearly explained to

the pupil, a repetition of the offense can be handled as severely as the occasion justifies.

5. The desire to create a sensation may often be detected before it is expressed if the teacher is sufficiently alert. (*a*) When possible, direct attention to the pupil by a sudden question that gives him the desired opportunity to perform. If the pupil is working at his seat, go to him and suggest an errand, a modified assignment, or other activity in which he can find relief. If this suggestion has the effect of a personal confidence, his behavior is not likely to be antagonistic. (*b*) If a pupil tends toward freshness in his replies, 'beat him at his his own game' if this can be done without loss of dignity; or do what you can to direct his impudence from yourself to the class as a whole. (*c*) Ignore unusual actions if performed unconsciously or without deliberate attempt to create disturbance. This applies to such activities as are likely to wear themselves out, such as sharpening pencils, adjusting shades, and other diversions.

C. Procedures to punish individual offenses from whatever cause. — Punishment, though a last resort, is usually necessary when the teacher's authority has been directly challenged. In administering punishment certain considerations are exceedingly important: (1) Make the punishment fit the offense as closely as possible; (2) make the punishment a real punishment for the particular pupil; (3) Let the punishment be social in character whenever the nature of the offense permits.

Apply these considerations to the following questions: —

1. Experience has shown the following forms of punishment to be generally overworked in the high school.

Suggest a possible weakness of each: — threats and scolding; additional school work; detention during recreation periods; reducing marks earned by good work; personal indignities of the duncecap variety; "saturation" or making the individual keep up his singing, face-making, etc., until tired of it; sarcasm; requiring offender to clean erasers, scrub floors, etc., when such work has no connection with the offense.

2. Other forms of punishment that are sometimes effective are listed below. On the basis of your experience and reading, suggest such merits *and* defects as you might expect each of these to have as applied *in general.* Suggest also a typical situation in which you consider each form of punishment appropriate: (*a*) reproof in class; (*b*) keeping after school; (*c*) sending to principal; (*d*) sending to study hall; (*e*) removing privileges; (*f*) reports to parents; (*g*) reproof out of class; (*h*) isolating the pupil; (*i*) disgrace of group to which offender belongs; (*j*) corporal punishment; (*k*) suspension; (*l*) expulsion.

3. Morehouse quotes Tompkins' suggestion that the offender be excused from the regular class work until he has written two thoughtful essays on "Why I should not whisper, cheat, loaf, etc.," and "What I shall do about my offense." Comment on the general effectiveness of this form of punishment.

Section V: Suggestions concerning Procedures

In applying the procedures mentioned above or such others as you may propose for the situations described in the next section, *the following recommendations are important:*

1. Handle every situation yourself, except in situations of such a personal nature that you cannot act without prejudice.

2. In every disciplinary relation with a pupil, appeal to him *on the highest level which he can understand* whether this be reason, sympathy, command, or physical coercion.

3. In setting up standards of social conduct in class always make an estimate of the pupils' home standards. The latter usually represent the most that can be expected of the class as a whole until the reasons for different conventions have been systematically taught.

4. Rely at all times and as far as possible on the group sentiment of the class. Cultivate this if possible to the point where disorder is regarded as a group offense.

5. "Sterilize the environment" of trouble by conducting all class routine with utmost efficiency and by removing all temptations to disorder.

6. Before taking any disciplinary action decide whether the pupil is deliberately attempting to dispute your authority. Do not assume that he is trying to antagonize you personally until his manner makes it evident to the class that such is the case. Immediate and drastic action is then imperative with punishment as the last resort.

Section VI: Problems for Solution[1]

Assume that you are the teacher concerned in the following cases. What would you do? Indicate briefly with respect to each situation what action you consider appropriate. Describe the procedure *in sufficient detail*

[1] For other suggestive problems similar to these consult J. B. Edmonson, *Problems in Secondary Education*, Public School Publishing Co., problems 17–25. Also Edmonson and Schovling, *Problems of the High-School Teacher*, Nos. 15–21.

to make clear *the manner* in which you would apply it. While the above procedures are intended to be used, rely chiefly on your "common sense" in the selection of appropriate remedies since many involve motivation.

1. While writing at the board with your back to the class you are struck by a paper-wad or piece of chalk. The class sees it but does not laugh. They wait in suspense to see what you will do.

2. You have asked the class to keep entirely silent so that the note of a tuning-fork may be heard. One boy in plain view of the class lets the window shade snap which prevents those near him from hearing the note. Loud applause from the class.

3. You enter your room after recess and find the Webster Unabridged Dictionary lying on the floor and badly damaged. Two pupils in the room profess complete innocence.

4. A girl whom you have just called to order and placed on a front seat continues to mutter various uncomplimentary remarks about yourself, the class, and other topics which can just be heard by her neighbors.

5. Three very able pupils in the back row keep up a whispered conversation concerning the class work which they feel to be entirely legitimate. When told that the whispering disturbs others, they keep silent for a time but show much less interest in the class discussion. If given the opportunity these pupils do all the talking for the class.

6. About half of one of your classes persistently refuse to complete assignments out of class which they begin in class rather successfully. Their attitude is indifferent rather than rebellious.

7. On your way home from school you hear your school nickname shouted at you from across the street by a boy whom you have recently punished. He is standing with three other boys who are visibly amused.

8. The most intelligent pupil in a class is persistently frivolous and uses his ingenuity to secure passing marks with the least possible effort. His popularity tends to make this attitude contagious.

9. One pupil in your class pretends that he is mentally incapable of handling the regular assignments. He is the class "goat" and the occasion for much general disorder.

10. Your room is next to a room in which a class in music is conducted. Your pupils cause disorder by humming the tunes whenever they are working at their seats.

11. You enter the room on April first to discover a "comic" valentine glued fast to the board with the principal's name written beneath it.

12. In the last period of the first warm day in spring the class seems incapable of sustained mental effort. Signs are evident that group disorder is likely to result.

13. A pupil who represents the school debating club comes to the class at the close of the hour and asks permission to read a notice calling for the school's support at an approaching debating contest. Your class interrupts the reading by cat-calls and disparaging remarks about the team and debates in general.

14. In replying to a question a pupil deliberately repeats it in such a way as to make the question ridiculous. He then proceeds to answer it to the great amusement of the class.

15. A boy who seeks the reputation of being "fast" is constantly on the alert to read a double meaning into the most innocent remark and to start a general giggle.

Section VII: Personal Problems

Submit full details concerning any disciplinary problem which you may be trying to solve at the present time, or describe such of your former problems as you consider to have been particularly troublesome. Describe action taken and state results.

If you have never taught, describe any concrete disciplinary situation you may have in mind which you consider yourself unable to remedy.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).

Chapter III, pp. 41–45 and top of p. 50, outlines factors in the disciplinary control of a class which are significant from the standpoint of supervision.

S. S. Colvin — *Introduction to High School Teaching* (1917).

Chapters IV, V, and VI contain suggestions toward meeting typical classroom problems which are probably more helpfully presented than those contained in any other single reference.

W. E. Stark — *Every Teacher's Problems* (1922).

Chapters II, III, and IV present typical class situations which challenge the teacher's resourcefulness. See also Chapter XIV which discusses relationships with parents.

G. D. Strayer and N. Norsworthy — *How to Teach* (1917).

Chapter XI considers discipline in terms of moral-social conduct

and reviews the principles which underlie, but do not always suggest, effective disciplinary procedures.

Supplementary References for Individual Selection or Assignment

W. C. Bagley — *School Discipline* (1915).
The book as whole contains full consideration and clear analysis of the factors upon which depends the teacher's control of a class. Concerned largely with elementary school practice.

C. H. Johnston — *The Modern High School* (1914).
Chapter XXIX sets forth the theoretical aspects of school discipline in terms of ethics. Other chapters of this book discuss different features of the school organization with respect to administrative efficiency and thereby suggest various practical approaches toward the central problem, viz. how to improve the general tone of the school.

F. M. Morehouse — *The Discipline of the School* (1915).
A standard book of reference on the theory and practice of disciplinary procedures. Illustrations are abundantly supplied and helpfully discussed. The few guiding principles governing disciplinary action are presented with great clearness.

H. W. Nutt — *Principles of Teaching High-School Pupils* (1922).
Chapter XI gives a good perspective of the problem in summary form.

A. C. Perry — *Discipline as a School Problem* (1915).
Chapter XXV makes a sound analysis of important factors.

J. A. Puffer — *The Boy and His Gang* (1912).
Suggests the importance of disciplinary control through pupil leaders.

R. W. Pringle — *Adolescence and High School Problems* (1922).
Chapters XVIII, XXIX, and XXX discusses sex education, moral education, and principles and methods of appeal in a thoroughly practical fashion.

J. B. Sears — *Classroom Organization and Control* (1918).
Chapter VII summarizes important factors. The concluding paragraph is an excellent statement of the problem.

E. L. Thorndike — *Principles of Teaching* (1906).
Chapter XI discusses "responses of conduct" on the basis of psychological evidence.

Additional References to Be Supplied by Instructor

(Note: Space is provided here for the listing of the many references which can be found applicable to the disciplinary conditions of the particular types of school represented by members of the class. The references listed above are entirely general in their application and are therefore less useful than others pertaining to problems of rural school management, etc.)

CHAPTER VII

THE USE OF THE ORAL QUESTION

Have you ever known a high-school teacher to make a real success in the profession who was unable to use the oral question skillfully? Think this over.

The importance of questioning, like the importance of any other factor in teaching, must always be calculated in terms of its effect upon the learner. Consider the effect upon yourself of the question at the top of this page. Does the interrogative form stimulate more thought on your part than the mere statement of the ideas aroused by the question might stimulate? If so, the comparison suggests that the question — whether stated or implied — is an essential factor in the learning process. Learning consists in the making of connections between familiar and unfamiliar elements in the same situation. The well-framed question, by directing attention to these unfamiliar elements, has the effect of making the learner uncomfortable until he has connected them with what he already knows. It thus serves both to indicate *what ideas the learner should connect* and *to furnish a motive for connecting them.* For these reasons, the "right" question is the psychological basis for all learning. The question is the best (and in its broad interpretation, the only) means of stimulating thought. The importance of skill in the use of the question is accordingly great.

The question as a challenge. — *Assuming that the value of any question depends upon the extent to which it demands attention and stimulates thought by challenging the learner's common sense,* estimate the relative value of each of the following ten questions in terms of their effect upon you:

1. Do you consider the question an important factor in teaching?
2. Why?
3. Should a teacher always plan the more important questions before meeting a class?
4. Is the thought question more stimulating than the fact question?
5. For what purposes is the fact question more useful?
6. Do most teachers ask too many questions in the course of a period?
7. What conditions should determine the number of questions asked?
8. What are the common mistakes which teachers make in using the oral question?
9. What are some of the important characteristics of a good question?
10. How may you, or any other teacher, best learn how to ask good questions?

Consider the above questions as follows:

1. Which four are the easiest to answer?
2. Which two are the most difficult to answer?
3. Which one offers the greatest challenge to your common sense? Why?
4. Are the questions properly related? Does the series of questions serve to direct your thinking progres-

sively toward a conclusion you consider worth while? Discuss your answer.

Section I: How Can Skill in Questioning Be Acquired?

A broad question such as the above heading to this section may be called a *developing* question. No reply can be made to it which does not lead to other questions and these to further questions until the topic has been fairly well explored. If, for example, one replies "By practice" to the question — "How can skill in questioning be acquired?" it is evident that many other questions are raised; such as, "By what sort of practice?" "How far does planning increase the value of practice?" "What can be learned about the principles of questioning that will make practice more effective?" and the like. It may, therefore, prove helpful to follow through such questions as the above in order to illustrate the use of a developing question.

There is abundant evidence to show that *mere* practice does not lead to skill in questioning. The veteran teacher whose daily broadside of fact questions reveals complete ignorance of the question's possibilities as a form of challenge, is usually not far to seek. At the other extreme is the novice who can not apply the principles he knows until he has learned to apply them through practice. Practice is clearly essential, but practice which is guided by established principles is vastly more useful than practice which is not. "When a teacher conscientiously makes study of the subject, analyzing and criticizing his own attempts, trying and failing, and trying again, it is possible to develop technique in questioning,

just as it is possible to develop technique in any other art. It is absolutely essential to bring conscious attention to bear upon the subject before one can command the habit of questioning well."[1]

If this means anything, it means that a teacher who wishes to improve his questioning should *plan* the major questions to be asked. All questions, obviously, can not be planned, and any attempt to follow the plan rather than the natural development of the topic in class leads directly to failure. But the middle course between random questioning and questioning which is planned in the light of probable developments, is clearly possible and much to be desired. Any teacher can certainly plan the statement of development questions, can follow through in his mind the various courses which the development of these questions is likely to take, can distinguish the points to be emphasized, tested, or presented as problems for solution; can calculate the rate at which questions should be asked, and can test his own skill in the use of questions by approved standards — provided he understands the principles which apply to each of these particulars and adapts them to the given class. *The following essential questions should, therefore, be separately considered:*

1. *What are the characteristics of a good question?*
2. *How does the intended effect determine the type of question?*
3. *What conditions determine the number and rate of questions?*
4. *How may efficiency in questioning be tested?*

[1] R. Stevens, *The Question as a Measure of Efficiency in Instruction* (1912), Teachers College, Columbia University. Bureau of Publications, p. 6. Quoted by permission of the publishers.

Section II: The Characteristics of a Good Question

The general characteristics of a good question can be inferred from the statement that questions should be as *natural* as conditions permit. The natural question is the sort of question that one asks when he really wishes to learn something. The teacher who can at will create the atmosphere of an interested, informal conversation, in which natural questions are raised and answered on all sides, has largely mastered the technique of questioning. If, without seeming to do so, he can lead such natural questions to a previously determined conclusion, his mastery is complete. But such skill in questioning is rare. It is also very difficult to practice when the class is large, since the questions are few which one would naturally address to thirty individuals at once. Consequently, the teacher's questions are usually *formal*. They are intended rather to produce a certain effect than to secure information desired for its own sake. The pupil in replying to such questions, therefore, says rather what he thinks is expected of him than what his own interests suggest. The formal question, however, has an advantage in the stimulus to clear thinking which the large class supplies. The satisfaction which the pupil obtains from making a correct response often stimulates better thinking than the question itself would produce if addressed to the pupil by himself. Hence formal questions, to prove effective, must present this challenge to each pupil in the class. The technique involved in framing and giving them is accordingly important.

The specific characteristics of the good question may be listed as follows:

1. It arouses interest by indicating a fresh point of view or a new element in the situation.
2. It relates this unfamiliar element to familiar experience; *i.e.* it calls up associated facts.
3. It is difficult enough to challenge the pupils' efforts, but not so difficult as to discourage them.
4. It is brief and so definite that only one meaning is possible.
5. It is asked in a leisurely but businesslike manner, the rate in each case depending upon the amount of thinking which the question requires.
6. It is framed so as best to accomplish the purpose intended, whether this be to emphasize a point, to test the pupils' information, or to stimulate the pupils' thinking.
7. It calls for only such answers as a majority of the class may reasonably be expected to give.
8. It is usually addressed to the entire class before one pupil is called on for reply.
9. It is asked in proper sequence to carry the thought forward, so that the series of questions brings out the unity of the idea developed.

Criticism:

1. Read over this list of characteristics carefully. Check your understanding of each by suggesting to yourself (or stating on paper) a series of questions which violate each of the above requirements.
2. Do you believe that each of these requirements must be met by a question before it can be called a good

question? List such of these requirements as you consider of doubtful validity as applied to the subjects you teach.

3. Criticize the following questions as addressed to a ninth-grade class. List the questions by letter and follow each letter by numbers to indicate which of the above requirements each question apparently fails to meet:

a. "Johnson, what can you tell me about the lesson?"

b. "What do you know about the Great War?"

c. "How about the advantage of getting started on time? Isn't there a great advantage there? Doesn't it help a great deal?" (From Colvin.)

d. "That is just right. They were coming to reflect upon things; and what was another thing that went with that? As you reflect upon what you have done, and upon what you are going to do, and upon what your neighbors are doing, and what you think they ought to do, you grow wise. But what is preliminary to that?" (From Stevens.)

e. "Have you ever seen steam coming out of a kettle? Have you ever seen mist rising from damp ground at night? Is the air outside the kettle colder or warmer than the air inside? How can you explain the formation of the steam and the mist?"

(From Colvin.)

f. "How would you try to make your listener feel as you feel about something you are describing?"

(From Colvin.)

g. "Do you like this poem we have just read?" (Pupil says he does.) "Why do you like it?"

Section III: How Does the Intended Effect Determine the Type of Question?

As implied above there are at least three distinguishable effects or purposes for which oral questions of three types may be asked; namely, to emphasize, as in the rhetorical question; to test, as in the fact question; and to stimulate thought, as in the problem or thought question. These three types are by no means clearly defined in common practice, since the distinctions between them consist in the increasing amounts of thinking required. It is the teacher's problem to estimate the amount of thought which the point in question justifies, and then frame the question so as to produce it.

Illustration. — Think through the following series of questions which are intended to develop the idea contained in the preceding paragraph. Number the questions to indicate the order in which they would stand if arranged according to the increasing amount of thought required.

1. Efficient teaching demands that the pupils be trained to think to some purpose, doesn't it?

2. Have you ever observed teachers who asked questions that required more thought than the answers were worth?

3. Did these teachers make the mistake of asking questions that were not clear, or the mistake of asking questions that were unrelated, or did most of them make both mistakes?

4. If rhetorical and memory questions are useful as means of emphasizing related facts already learned, when should the teacher use thought questions?

5. Assuming that his questions are properly related, should a teacher try to make each question require as much thought as possible?

6. Why, or why not? Explain your answer.

7. In what respects would you revise the foregoing questions to develop this idea more clearly? Criticize this development.

Reply briefly to the following questions concerning the above:

1. Does each successive question in the above series demand an increasing amount of thought from you? Which are out of order?

2. Is each successive question *worth* an increasing amount of thought? Which questions demand more thought than is justified by the value of your reply to the development of the idea as a whole?

3. Which of these questions should you classify as rhetorical or emphasizing questions? Which memory or fact questions? Which thought or judgment questions?

4. Do you consider the three types of questions equally useful in developing this idea? If the idea were to be developed more gradually by adding questions to fill the gaps in the above series, which type of question should you add?

Section IV: What Conditions Determine the Rate and Number of Questions?

That both the rate and number of questions asked during a class period must depend upon what the teacher is trying to do has been implied in the foregoing discussion. A series of rapid-fire drill questions asked with barely sufficient pauses to permit the pupil to reply in a

word or two, is, at times, an excellent device for the review or testing of what has already been learned. It is, however, practically useless as a *teaching* device; that is, as a means of helping a class to learn new material. This section undertakes to emphasize this fact by directing attention to the general abuse of the question when used to develop new ideas and to stimulate thought.

Miller submits the following evidence to show that high-school pupils are seldom allowed sufficient time for replies to thought questions: [1]

> "The writer is convinced that in classes as organized at present thought-questions are put at a rate too rapid for a large majority of the class. The rate in most classes is more nearly adapted to the best 10 pupils in 100. Anyone may be convinced of the truth of this statement by observing teachers of freshman classes in the high school if he will take the trouble to measure with a stop-watch the interval of time allowed for answers to thought-questions. The median time required by freshmen to see the simple relations in the analogies test we employed was about 14 seconds. Most teachers, especially beginners, show considerable uneasiness, at least, if answers to thought-questions that involve the grasping of relations much more complex than those in the analogies test are not forthcoming within 10 seconds. If the answer is not given almost immediately, the teacher interrupts by meaningless remarks, by a needless repetition of the question, by passing the question on to some other pupil, or by answering the question herself. She can't endure the silence that must prevail while the pupil is thinking and organizing his material, and commonly feels that she must break the silence by a remark of some kind, however useless and distracting it may be.
>
> "During the past year the author has had occasion to observe the work of over 100 practice teachers. There was no one fault

[1] W. S. Miller, "The Administrative Use of Intelligence Tests in the High School." *Twenty-first Year-book*, National Society for the Study of Education, Part II, p. 207. Quoted by permission of the publishers, The Public School Publishing Company.

more common than the one under discussion. It is due to the failure to recognize the fact that time is required to perceive thought-relations and that a large proportion of the time in the recitation must be allowed for the exercise of this important function."

This same conclusion, that pupils are seldom allowed time for thinking when the question and answer procedure is used, is reached by Stevens on the basis of the number of questions asked. Stevens' report should be carefully examined for data applying to your special subjects.[1] The nature of its contents is illustrated by the following summary of the questions put to the freshman class of a New York City high school in the five recitation periods scheduled for one day:

Showing the questioning activity of particular classes throughout an entire school day.
First-year high school, Class period, 40 minutes

Subjects	*Questions*	*Answers*
German	176	176
English	88	88
Algebra	120	120
Latin	61	61
Science	71	71
	516	516

"In these five class periods of forty minutes each, without deducting time for the change from class to class, the assignment of new work, etc., etc., the total time is 200 minutes, and the total number of questions recorded 516, so that the rate is about 2.58 questions and 2.58 answers per minute for each of the 200 minutes."

[1] R. Stevens, *The Question as a Measure of Efficiency in Instruction* (1912), Teachers College Contributions to Education, No. 48. Quoted by permission of the publishers, Bureau of Publications, Teachers College, Columbia University.

Stevens' conclusions are summarized as follows:

"A large number of questions is an indisputable index of bad teaching (except in some modern language and developmental lessons).

"A small number of questions does not necessarily indicate good teaching."

Such data as the above, which the remainder of Stevens' report shows to be typical of high-school teaching in general, bear direct application to every teacher's use of the oral question. Make the following applications to your own case:

Criticism:

1. How many questions do you ask on the average in the course of one class period? (Or if not teaching now, apply this to some teacher observed.)

2. How many seconds do you allow a pupil on the average in which to reply to a question involving more thought than the mere recollection and statement of a fact already learned? (Or time the teacher observed.)

3. May a number of fact questions asked in proper sequence serve to reduce the time necessary for replies to questions involving real thought?

4. Are individual differences in the pupils' rates of thinking provided for better by asking a series of developmental questions orally, or by explaining clearly the meaning of a few comprehensive questions and then allowing each pupil to work out the answers (on paper if necessary) at his own rate? Why? What defects, if any, has the latter procedure?

5. "Pure memory questions are good questions to use occasionally, but the element of memory is included in

all better questions. Why then ask a half dozen pure memory questions when one better question can be made to embody memory and at the same time call for association in memory and some exercise of judgment?" Discuss this rhetorical question in terms of your own experience or observation.

Section V: How May Efficiency in Questioning Be Tested?

A. Certain criteria are here proposed from the standpoint that common practice in high-school teaching errs on the side of too much oral questioning. For the sake of provoking criticism and revision they are stated with somewhat more finality than might otherwise be justified.

1. The majority of questions asked during the period should meet the specific requirements as to form and technique proposed in Section II. This applies, of course, to the spirit of these requirements rather than to the letter.

2. The question, no matter how skillfully employed, becomes tedious through overuse.

3. The high-school teacher's use of the oral question should be largely confined to the development of new ideas or principles, drill upon material partly learned, and testing of material already learned.

4. A large class of mixed abilities is encouraged to do its best thinking when the laboratory procedure is followed, each pupil working at his own best rate upon exercises (related questions, problems, experiments, etc.) prepared in advance by the teacher. This procedure employs the oral question largely as a means of making sure that the class understands what it is expected to

do, as a means of helping the class as a whole think out a common difficulty, or as a means of helping the individual pupil think out a difficulty peculiar to him.

5. Where the class is composed of pupils of uniform abilities, questioning may more safely be used as the customary class procedure.

6. Whenever used, the question should require no more thought than the answer is worth. Hence the answer should always be considered in framing the question.

Criticism:

a. Apply the above criteria to the questioning employed in this chapter. Check those criteria which are not satisfied.

b. Apply these criteria to your own questioning or to the questioning of some teacher you have observed. List the criteria you consider debatable and offer what evidence you can in opposition to those you have listed.

B. A rating list is quoted from Burton[1] as a test of the teacher's ability in oral questioning. Apply the questions to one of your own class performances as well as you can, or else apply them to another teacher of your subject whom you have observed.

1. Does the teacher manifest ability to word questions clearly and concisely? Avoid series of short, fragmentary questions.

2. Can she adjust easily to legitimate interruptions, disposing of them or following them up with clear-cut direct questions? Does she encourage independent questioning by the pupils?

[1] W. H. Burton, *Supervision and the Improvement of Teaching* (1922), p. 91. Quoted by permission of the publishers, D. Appleton & Co.

3. Is she quick to see when her language or construction is confusing to the class? Can she re-word statements quickly?

4. Does she use thought and drill questions in right proportions? Directed at proper material? Does she vary the pace?

5. Does she distribute questions over the class fairly well? In terms of individual differences?

6. Does she avoid answering the questions herself? Avoid repeating them except in legitimate cases? Insist on clear, intelligent answers? Avoid repeating the pupil's answer?"

Section VI: Specific Application

It is assumed that you have examined the material in this chapter with a view to selecting those considerations or criteria by which your own use of the oral question is most likely to benefit. Review the chapter rapidly to check the points you consider important in your own case. Then work out a series of questions which you might use to develop an important topic in one of the classes you teach or in a class you might teach. Base the questions, if possible, on material about to be taken up in class, so that you can revise the questions in the light of the class response. If you have no class to observe, select any material you consider appropriate.

Selected References

Parallel References for Group Study

G. H. Betts — *The Recitation* (1910).

This book contains a section on methods of questioning which on account of its brevity gives an excellent perspective of the problems involved.

W. W. Charters — *Methods of Teaching* (1912).
Chapter XVIII, Section 3, presents useful standards for the classroom question.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapter XV explains the functions of the oral question and directs attention to common faults in classroom questioning.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter V summarizes the principles of good questioning.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter XX describes the conditions which questioning must meet to be efficient and points out errors to be avoided.

G. D. Strayer — *A Brief Course in the Teaching Process* (1911).
Chapter XI states the characteristics and usual effects of familiar types of question.

Wilson, Kyte, and Lull — *Modern Methods in Teaching* (1924).
Chapter XVII discusses six essentials of good questioning in terms which apply to high-school practice.

Supplementary References for Individual Selection or Assignment

J. W. Hall and A. K. Hall — *The Question as a Factor in Teaching* (1916).
Chapters I, III, and IV apply to high-school teaching

J. O. Malott — "Questioning in Education," *Educational Administration and Supervision* (1924).
Volume X, pp. 250–258, offers a short summary of the uses of the question.

W. S. Monroe and R. E. Carter — *Use of Various Types of Thought Questions and Their Relative Difficulty for Students* (1923). University of Illinois, College of Education, *Bulletin* No. 14.
This study opens up an interesting problem for research and reaches conclusions of practical value.

R. Stevens — *The Question as a Measure of Efficiency in Teaching* (1912).
A pioneer study of "the question" on the basis of objective data. The conclusions are significant.

E. K. Strong — *Introductory Psychology for Teachers* (1920).
Pages 18–23 distinguish the psychological elements involved in questioning.

S. Yamanda — "A Study of Questioning," *Pedagogical Seminary*, Volume XX, pp. 129–186 (1913).
A summary of previous investigations which contains a complete bibliography.

Additional References to Be Supplied by the Instructor

CHAPTER VIII

THE STUDY–RECITATION

ANYONE who has ever taught or who plans to teach a high-school class of twenty-five pupils or more should find interest in the question — "How may each pupil be kept busy on work useful to him throughout the class period?" For experienced teachers and beginners alike this problem has great practical importance, since a certain proportion of idle pupils in a class is sure to prevent the rest from making satisfactory progress and is likely to result in serious disorder.

The purpose of this chapter is to define a type of class procedure that has certain clear advantages over the conventional recitation in this respect. These advantages result from its more adequate provision for the needs of individual pupils. As here described this procedure is an ideal which not all teachers can reach. Many of its characteristic features can be adopted, however, as the conditions in a particular class permit. Although the terms "study-recitation", "supervised study", "directed learning", and others have but recently been applied to it, the procedure is one which the best teachers have always used. Its noteworthy features may be described as follows:

Procedure described. — The class period is used so far as possible as a laboratory in which "recitation" and "study," or explanation and application, are *varied as*

the occasion demands. This allows instruction which is needed by individual pupils to be given at the time when its need is keenly felt. The teacher prepares a unit of work and presents it wherever possible in the form of a definite class exercise that is organized about some central principle. The teacher stimulates enthusiasm for doing the exercise by presenting it as a "challenge" to the best efforts of the class — "How many of these problems can you solve?" etc. He explains the principle involved and anticipates difficulties for the class as a whole. The class then sets to work, each pupil working on the exercise at his own rate. The teacher circulates about the class to note the progress made and to discover the various difficulties encountered. When a *common* difficulty is noticed, the class is called to attention and the point is cleared up. Then the work is resumed. When various difficulties are found, the teacher directs each pupil (or group of pupils confronted by the same difficulty) according to individual needs. Since there is no upper limit to the work assigned, the more capable and rapid pupils do not monopolize the teacher's time and they may even assist the teacher in directing the efforts of other pupils in difficulty. No individual guidance is given to those pupils who can make *satisfactory* progress by their own efforts. The teacher is thus in a position to direct the other pupils' efforts while their appreciation of difficulties is fresh and can supply the amount and kind of direction by which each pupil will profit most.

Application to high-school subjects. — This type of procedure combines project teaching with the more systematic study of principles and drill exercises. Both

are, of course, essential in most high-school teaching. The merits of the procedure are most obvious as applied to typing, stenography, sewing, shop work, and other practical arts. Its merits as applied to academic subjects are less obvious though none the less real. There is equal opportunity in academic subjects for the pupils to undertake work of a definite character, if the teacher takes the trouble to make it definite, and it is equally essential that each pupil should measure the value of his learning by the achievement of definite results. Such definiteness is certainly possible in such activities as translation of foreign languages, interpretation of literary passages, the application of mathematical or scientific principles, the tracing of historical tendencies, and the like in other subjects. It should be further noted that when a pupil has shown that he is able to apply what has been learned by doing part of his assignment in class, he can be expected to complete it outside of class as "unfinished business."

A most lucid and stimulating exposition of this procedure is contained in H. L. Miller's *Directing Study*,[1] from which the following quotations may serve to clarify the above account:

> "Class teaching is economical. It is socially and intellectually desirable. Supervised study, effectively employed, and class teaching are essentially phases of a productive form of classroom procedure, the validity and value of which have been demonstrated in a large number of instances. The one type of activity supplements the other. One may be regarded as a corrective as well as a reinforcement of the other. It is highly important that teachers examine the methods which pupils employ in study, observe the

[1] H. L. Miller, *Directing Study* (1922), p. 86. Quoted by permission of the publishers, Charles Scribner's Sons.

amount and kind of work which they can accomplish in a given time, guide them in the proper distribution of time and energy in so far as possible, and assist them in the development of a more efficient organization of working habits. The aim is to direct study along intelligent and fruitful lines by making explicit to pupils ways and means of planning procedure, of schematizing the search, of handling data, etc. Directing study may be a means in the general movement for the improvement of secondary education."

Illustration. — The following illustrates the application in a class section of the University of Wisconsin High School:

"*Challenge* — A set of exercises in arithmetic, algebra, a foreign language, or any other subject in which a number of exercises in some organizing principle is clearly presented. To illustrate: Factoring in algebra (8th or 9th grade) is the unifying core of a part of the course. After five minutes of general explanation of a new phase of factoring in which the whole class participated, each pupil started into the set of exercises and worked as rapidly as possible. The teacher checked results, guided procedures, explained to any one pupil or group of pupils some principle needing further elucidation, called the whole class to concerted attention when any fundamental concept could be focussed upon economically. The exercises in this illustration involved the differences of squares. Some 60 exercises were listed. In the course of the remainder of the class period the number of exercises mastered ranged from 10 to 55. No upper limit was set. Each pupil worked forward in the challenge at his own best rate." [1]

"The same procedure may be employed in word study, work on sentences, reading of literature of a type or period, composition, exercises in foreign language, etc."

"Two important matters should be mentioned in this connection: (1) The organizing principle should be clear. (2) No upper limit should be set in the number of exercises. Enough work should be at hand to challenge every ability in the class group." [2]

[1] *Ibid.*, pp. 13–14. [2] *Ibid., loc. cit.*

Consideration of this principle as applied to the actual conditions of your own teaching demands careful study of such questions as are listed below. When you encounter any difficulties that you are unable to solve yourself, call them to the instructor's attention or note them for individual explanation or group discussion.

1. *Can the conventional recitation procedure give satisfactory results?*

2. *Can pupils study effectively in class?*

3. *How can the teacher apportion his time between the individual and the group?*

4. *What are the chief difficulties to be expected in adopting this procedure?*

These questions may be considered in order.[1]

Section I: Can the Conventional Recitation Procedure Give Satisfactory Results?

Time wasted during recitation. — "The writer has attempted to estimate in various high-school classes that he has visited the amount of time that pupils are actively engaged in their school work, and he has found results that are indeed astonishing. In two hundred classes considered he found one in which each pupil was mentally active but two minutes of the total forty-five; five in which each pupil was active for approximately five minutes; nine for ten minutes; twenty-one for fifteen minutes; thirty-seven for twenty minutes; fifty-five for twenty-five minutes; thirty-eight for thirty minutes; twenty-two for thirty-five minutes; nine for

[1] Various problems which serve to indicate the practical bearings of these questions on high-school work may be found in J. B. Edmonson, *Problems in Secondary Education*, problems nos. 40–45 (1923). Public School Publishing Co.

forty minutes, and three for forty-two minutes. These observations seem to indicate that under ordinary classroom conditions in a large-sized high school, half the day is wasted. While conditions vary greatly with various teachers, subjects, schools, and classes, it is probable that on the average the waste is no less than that found in the classes observed." [1]

Criticism:

1. At your earliest convenience ask an observer to make similar estimates of the time wasted in one of your class periods by noting on a pad the number of minutes during which all pupils are actively at work. Or else at regular five or ten minute intervals during a period have the observer count the number of pupils who are actively at work; then average these numbers.

2. For the present assume that your classes correspond to the average of the classes described above; that is to say, *all* pupils are participating for 25 minutes out of 45. Various possible causes for this waste are listed below. Check such of these causes as may operate in your classes or in a class with which you are familiar; that is, check all that you are *not* reasonably sure have been eliminated in the particular class.

Causes of waste:

a. Seating arrangement prevents teacher from giving individual explanations without disturbing the class as a whole.

b. Failure to use "completion," "cross-out," or other similar forms of testing in place of the oral quiz.

[1] S. S. Colvin, *Introduction to High School Teaching* (1917), p. 128. Copyrighted by The Macmillan Company. Reprinted by permission.

c. Unnecessary dictating or copying from board or textbook.

d. Writing material on board in class that might have been written beforehand.

e. Explaining the difficulty of a few pupils to the rest of the class who already understand it, as in correcting board work.

f. Neglect of slower pupils in effort to keep more rapid pupils busy.

g. Allowing rapid workers to wait for slower pupils to catch up.

h. Devoting entire period to explanation of work to be done out of class with no chance for application in class.

i. Calling on individuals to recite material already familiar to the class.

j. Failure to prepare exercises on which all pupils may work at once, each at his own best rate.

k. Failure to relate such exercises to an organizing principle.

l. Allowing insufficient time for replies to thought questions asked orally of the entire class.

m. Failure to adapt assignments to individual needs, or to make them clear.

n. Inadequate directions regarding work done out of class.

o. Failure to observe pupils at work to discover improper habits of study.

3. List about five of the items you have checked which you think occur most frequently either in your own teaching or in a class you can observe.

4. Do you consider any of these frequent causes of

waste to be almost inevitable in the conventional recitation procedure but largely preventable in the procedure above described? If so, which are they?

5. Describe specifically how they might be prevented.

Section II: Can Pupils Study Effectively in Class?

Your reply to this question will naturally depend upon what you understand by "study," a word used loosely by teachers to mean the preparation of assignments. By a more accurate definition study may mean serious thinking upon any subject for some particular purpose — to acquire and remember more information about it, to grasp the principles involved, to apply it to some other problem, to relate its conflicting elements and so find a solution, or the like. So interpreted it is perhaps evident that pupils must study in class if they are to learn in class. The original question then becomes "Why study in class rather than out of class?"

Discussion. — A. Various reasons for studying in class are listed below. Each of these, of course, does not apply to all pupils and all classes. Simply check such of these reasons as in your judgment undoubtedly apply to the majority of pupils in one or more of the classes you teach or in a class you can observe.

Reasons for studying in class:

1. In a general study hall pupils receive improper direction from other teachers; that is, they receive too much, too little, or the wrong kind of direction.

2. At home pupils receive the wrong kind of help, if not actually dishonest help, from parents or other pupils.

3. Few pupils have proper conditions for study at home; that is, suitable desk, light, heating, books, and other apparatus, and freedom from disturbance or frequent distractions.

4. Unless supervised to some extent, most pupils acquire wasteful habits of study; that is, they do not observe such common rules of efficient studying as the following: — form a definite idea of the desired result; have a specific purpose; grasp the meanings of new ideas by organizing them with previous experience; adopt a critical rather than a merely receptive attitude toward new ideas; memorize from the general to the particular; apply what has been learned as promptly as possible, etc.

5. During the interval between assignment in class and preparation in the study hall or at home, many pupils forget the bearing of the class discussion on the assignment, if they do not forget the actual directions received.

6. A pupil's need for instruction is usually greatest when in preparing an assignment he meets a difficulty which is new to him or which he is unprepared to solve — such as an unfamiliar construction in foreign language, an obscure definition in chemistry or physics, a "queer" problem in algebra, etc. Much discouragement, indifference, and failure are prevented if the right sort of direction can be given when the difficulty is met. This is seldom possible when assignments are not at least begun in class.

B. In the case of the above items which you have *not* checked, state briefly *to what extent* each applies to the class you are considering.

Section III: How Can the Teacher Apportion His Time Intelligently between the Individual and the Group?

Discussion. — A. On the basis of your present understanding of the directed learning procedure, state which of the groups in the following classes *most* requires the teacher's direction and suggest how the teacher might use his time to the best advantage of each group.

Assume that each class contains 30 pupils and that the conditions described below obtain for ten minutes of the forty-five-minute period.

1. Algebra, 9th grade. Factoring, all cases. Various examples assigned.

a. 15 pupils at board making satisfactory progress.

b. 5 pupils at seats unable to factor the difference of two cubes.

c. 10 pupils at seats have difficulty with different problems.

2. English, 10th grade. Selecting lines from Shakespeare's *Julius Caesar* which best serve to identify various characters in the play.

a. General tendency to select lines spoken about the character rather than those spoken by the character.

b. 13 pupils evidently misunderstand the real nature of Antony.

c. 7 pupils are not sufficiently familiar with the play to interpret the lines.

d. 10 pupils making satisfactory progress.

3. American History, 11th grade. Selecting commercial factors in the outbreak of the Civil War.

a. 10 pupils disregard complications with European countries.

b. 18 pupils fail to note effect of northern commercial activities on preparedness.

c. 2 pupils have completed their lists to their own satisfaction.

B. Endeavor to formulate and state a general principle by which the teacher may wisely apportion his time among different groups in the class period.

Section IV: What Are the Chief Difficulties in Adopting This Procedure?

Criticism. — A. Criticize the type of directed learning procedure herein described by listing with brief comment such undesirable or impracticable features as tend to discourage you from adopting this procedure in the courses you are teaching or expect to teach.

B. Check one of the following obligations that the procedure imposes on the teacher which you consider the most difficult to meet: (1) Noting the progress of individual pupils; (2) giving an explanation to one group without greatly disturbing the rest of the class; (3) preparing material in exercise form which involves application of the principles studied.

Section V: Specific Application

Select some one unit of subject matter from one of the courses you teach that is fairly fresh in mind. State the principle involved. Then construct a series of

exercises to which the principle applies. Challenge the pupils' efforts as directly as you can. The exercises when complete should require more work than can be readily accomplished by the best pupils in one period. List such topics as you would have to explain and discuss with the class as a whole before the pupils could undertake the exercises successfully.

Criteria: The following criteria are offered for guidance in constructing such exercises. Each of the questions should be answered in the affirmative before the exercise can be regarded as fully adapted to the classroom procedure above described:

1. Is the principle which the exercise is intended to teach of sufficient importance for the given class to justify the time and effort required to teach it?

2. Is this principle so stated and illustrated that the class can fully understand it?

3. Do the exercises require the pupils to apply the principle in the way in which you expect them to use it later?

4. Are the applications which the pupils must make in working the exercise sufficiently easy? (*i.e.* has the class been sufficiently prepared to undertake the exercise?)

5. Are the applications sufficiently difficult? (*i.e.* do these applications challenge the pupils' common sense and demand a sufficient amount of thought?)

6. Are the exercises sufficiently concrete and definite? (*i.e.* can the solutions be readily marked "right" or "wrong" and recognized as such by the pupils?)

7. Does the exercise as you have constructed it require enough work to keep the best pupils in the class busy throughout the period?

Section VI: Criticism of This Chapter as an Exercise for Use in the Study-recitation

Directions:

A. Criticize this entire chapter as follows:

1. Does the introductory description of a somewhat ideal class procedure supply an organizing principle for the exercise as a whole? Discuss your answer.

2. Does the work which you are expected to do in the course of this exercise bear directly upon this organizing principle? If so, does it teach you to apply the principle more effectively than you could probably be taught by lecture or other group methods? Discuss your answer.

3. Does the exercise challenge your efforts, *i.e.* do the questions appeal to you as worth answering and so encourage your participation in the class work?

B. Reply to the following questions if the last section has been worked in this class as a means of demonstrating the procedure.

1. Which of the causes of waste listed in Section I have appeared in this class during discussion of this particular exercise? (Make allowance for special conditions in this class which should alter the procedure.)

2. What difficulties did you encounter that were not removed by the class discussion or individual conference?

3. How successful do you consider this exercise to have been for the class as a whole? Do you consider that each member of the class was directed in applying the procedure to his own teaching difficulties with as little waste as possible? Briefly discuss your answers.

Selected References

Parallel References for Group Study

A. W. Burr — "How is Supervised Study Doing?" *School Review*, XXXII, 224–226 (1924).
The data indicate the obvious defects in "supervised study" as commonly conducted.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapter XVII enumerates various factors in study supervision. The technique of teaching pupils how to study receives emphasis rather than the general class procedure, with which the foregoing chapter is concerned.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter XII summarizes essential principles involved in study supervision.

A. L. Hall-Quest — *Supervised Study* (1916).
The book describes various plans for the supervision of study in the classroom and discusses the organization of each high-school subject from the standpoint of independent study. The bibliography contains some 125 selected titles classified under the following heads: special phases of study, definitions of study, home study, methods and habits of studying, and the supervision of study.

R. L. Lyman — "The Class Meeting as a Laboratory Period," *School Review*, XXXII, 408–410.
This two-page article summarizes the essential features in the class procedure presented in this chapter.

H. L. Miller — *Directing Study* (1922).
The entire book discusses various phases of the procedure described in the foregoing chapter. Chapter I on "suggestive procedures," Chapter II on "administration of the class period," and Chapter IV on "organizing principles" in the lesson, are perhaps the more essential.

H. W. Nutt — *Principles of Teaching High School Pupils* (1922).
Chapter X gives a general statement of principles involved in the reorganized class period.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter XVI states the significant factors in study supervision and supplies illustrations from high-school practice.

F. W. Thomas — *Training for Effective Study* (1923).
A general and well-organized discussion of study in its broader aspects. This treatment differs from that of Hall-Quest in that it emphasizes the learning process rather than the organization of a study program.

J. A. Wiley — *Practice Exercises in Supervised Study and Assimilative Reading* (1922).
A helpful guide for the classroom teacher. It outlines a technique in teaching pupils to study any subject which involves the use of textbook material.

Supplementary References for Individual Selection or Assignment

W. L. Beauchamp — "Supervised Study in Elementary Physical Science," *School Review*, XXXII, 175–181 (1924).
The article describes a technique in teaching a sample unit in the University (of Chicago) High School.

E. R. Breslich — "Supervised Study in Mathematics," *School Review*, XXXI, 733–747 (1923).
A companion article which outlines an effective procedure in detail as employed in the same school.

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).
Chapter IX deals with the requirements of effective study supervision and is concluded by an extremely useful summary of questions for the teacher's self-rating.

R. E. Carter — "Teaching a Study Habit," *School Review*, XXIX, 695–706, 761–775 (1921).
The article describes class exercises which afford practice in the application of rules for effective study.

T. R. Cole — "The High School Repeater," *School Review*, May, 1921. XXIX, 321.
The note shows need for the reorganization of classroom procedure for pupils who have made a wrong start.

Evelyn Dewey — *The Dalton Laboratory Plan* (1922).
Chapters IV and V outline the administrative conditions in-

volved in the adoption of laboratory procedures for an entire school. Chapter III on "the assignments" is most directly concerned with classroom technique.

C. E. Finch — "Study Tests in Rochester Junior High Schools," *School Review*, March, 1920.

The report shows the inability of pupils to use books efficiently and the value of home-made tests as a means of teaching efficient study habits.

Kieber and Woody — "Individual Laboratory *vs.* the Demonstration Method in Teaching Physics," *Journal of Educational Research* January, 1923.

The problems of laboratory work in a subject to which it is presumably well adapted, are well described.

B. E. McCormick — "A Study of Failures," *School Review*, XXX, 431–442 (1922).

Data obtained in one high school are interpreted to indicate reasons for failures in the various subjects and to propose remedial measures.

H. L. Miller — "Directing Study for Mastery," *School Review*, XXX, 777–786 (1922).

The principles of the author's book, *Directing Study*, are applied to the teacher in training.

W. S. Miller — *Twenty-first Yearbook;* N. S. S. E., pp. 207 ff.

Data from experimental studies show the impossibility of uniform progress by means of the question-answer procedure.

W. S. Monroe and D. K. Mohlman — "Errors made by High School Students in One Type of Textbook Study," *School Review*, XXXI, 36–47 (1923).

The article shows what habits need to be taught in the effective use of books and offers practical suggestions for the teaching of these habits.

H. C. Morrison — "Studies in High School Procedure," *School Review*, XXIX, 19–30, 106–18, 182–97 (1921).

The studies discuss I. Direct and Indirect Teaching, II. Half-Learning, and III. Mastery in the Light of Objective Data. See also his *Teaching Technique of the Secondary School* (1923) (Edwards Brothers, Ann Arbor, Michigan), which contains a fuller exposition of "Mastery."

C. J. Pieper — "Supervised Study in Natural Science," *School Review*, XXXII, 122–133 (1924).

A companion article to those of Beauchamp and Breslich noted above which analyzes the procedure into teaching elements.

W. C. Reavis — "The Administration of Supervised Study," *The School Review*, XXXII, 413–319 (1924).

This article is the last of this series of articles describing the teaching procedure employed in various departments of the University (of Chicago) High School. It discusses the effect of these procedures upon the school's administration and the respects in which the administration can contribute to the success of the procedure.

A List of References on How to Study

J. Adams — *Making the Most of One's Mind.*
H. E. Bennett — *Psychology and Self-Development*, Chapter I.
A. L. Hall-Quest — *Supervised Study*, Chapter VII.
J. B. Kerfoot — *How to Read.*
H. D. Kitson — *How to Use Your Mind.*
R. L. Sandwick — *How to Study and What to Study.*
D. Starch — *Educational Psychology*, Chapter XI.
C. Swain — *How to Study.*
E. L. Thorndike — "Reading as Reasoning," *Journal of Educational Psychology*, VIII, p. 323, June, 1917
G. M. Whipple — *How to Study Effectively.*

A List of References on Teaching How to Study

W. C. Bagley — *Craftsmanship in Teaching*, Chapter VIII.
C. P. Colgrove — *The Teacher and the School*, Chapter XX.
L. B. Earhart — *Teaching Children to Study* (1909), Chapter VIII. *Types of Teaching*, Chapter XIV.
H. H. Foster — *Principles of Teaching in Secondary Education*, Chapter XII.
A. L. Hall-Quest — *Supervised Study*, Chapter IV.
C. H. Judd — *Psychology of High School Subjects*, Chapter XVIII.
L. A. McGregor — *Supervised Study in English.*
F. M. McMurry — *How to Study and Teaching How to Study.*
H. L. Miller — *Directing Study.*

M. E. Simpson — *Supervised Study in History.*
G. D. Strayer — *Brief Course in the Teaching Process,* Chapter VIII.
Strayer and Norsworthy — *How to Teach,* Chapter XIV.
F. W. Thomas — *Training for Effective Study,* Chapter VII.

Additional References to Be Supplied by the Instructor

CHAPTER IX

THE LESSON PLAN

Success in high-school teaching, like success in most other activities, depends largely on forethought. In meeting classroom situations, as in meeting other situations that are largely predictable, efficiency is impossible without a definite plan of action. The teacher should at least know definitely *what* he is trying to do, *why* he is trying to do it, and *how* he can obtain best results from the given class. Otherwise some wasted effort is inevitable.

Most high-school teachers will accept the above platitudes without question and yet fail to plan their teaching systematically. There are many good reasons for this failure. Among the commonest is the teacher's lack of time and energy. Another important reason is that lesson planning can not be standardized. No one can construct an entirely satisfactory lesson plan except the teacher by whom it is used. Consequently, the individual teacher, until he learns by experiment just what elements in the lesson *he* gets most help from planning, concludes that planning is not worth the trouble it takes and spends the time thus saved in the making of mistakes that might have been avoided.

A large part of the average teacher's impatience with lesson planning might be expected to result from the

various treatments of the subject in books on the technique of teaching. For a beginning teacher to think through, much less write out, the detailed outlines that have been seriously proposed for daily use would leave about three hours for sleep. Yet such detailed outlines may serve a very useful purpose if the teacher studies them to find out what he does *not* need to plan systematically, so that he may plan other elements to better advantage; and much of the material contained in this chapter is intended to serve this somewhat negative purpose.

Discussion. — 1. About how much time do you give on the average to planning for each class period?

2. Do you consider that this time is spent to the best advantage; that is, do you plan only such elements in the lesson as you could not work out equally well in class, and do you follow your plans?

3. If you are not teaching, discuss the statement that a beginning teacher does well to plan the detail of subject matter but merely the main procedures of method.

Section I: Plan for This Chapter

The relation between a lesson plan and the "lesson" as actually developed in class may be illustrated by the following plan which an instructor might use in this course to develop this topic by discussion. The plan here outlined is followed through in the remainder of this chapter, but much of it need not, of course, have been written out. If conducted orally, this outline might well have been reduced to items 2 and 3 under "Method of Procedure."

The plan in outline. *Aim:* To suggest the importance of some lesson planning for all high-school teachers, to indicate the elements which a plan may include, and to give practice in the construction of plans for your own present or future use.

Introduction: (Which undertakes to make you share the above aim.) The explanation for the high-school teacher's neglect of lesson planning lies in the fact that so few teachers know how to plan lessons effectively. "Does this fit your own case? How much planning do you do?" and similar questions.

SUBJECT MATTER	METHOD OF PROCEDURE
1. Necessity for planning high school teaching;	1. Discuss list of reasons offered by authorities with reference to
a. Reasons applying to teachers in general,	*a.* The relative importance of these reasons for teachers in general,
b. Reasons applying to the individual teacher.	*b.* The relative importance of these reasons as applied to your own teaching.
2. What elements in the lesson should the teacher plan?	2. Consider the relative importance of various elements listed in specimen plan.
a. Importance of these elements to the individual teacher, and	*a.* With reference to your own needs, and
b. Their importance to teachers in general.	*b.* With reference to teachers in general.
3. Construction of lesson plans	3. Construct plans to meet criteria
a. To meet criteria proposed, and	*a.* Proposed by instructor (exchange), and
b. To meet your own criteria.	*b.* Selected by yourself.
4. Bibliography and illustrative material.	4. Consult and comment upon Selected Readings.

Consider the above plan in connection with the following questions:

1. What elements in the above plan indicate *why* the topic should be studied?
2. What elements indicate *what phases* of the topic deserve most emphasis?
3. What elements indicate *how* these phases are to be taught?
4. What elements, if any, do not bear directly upon the aim stated above?
5. What elements are so obvious that they need not have been written out at all?

Section II: The Necessity for Planning High-school Teaching

The following list contains various reasons in support of the general statement that the high-school teacher should think through each lesson before teaching it. It is not necessary, though it is usually desirable, that some parts of such plans be put in writing. Most of the reasons below will be found discussed in the Selected References appended to this chapter.

By the daily practice of planning lessons the high-school teacher is encouraged 1. To connect the aims of each lesson with the aims of the course as a whole.

2. To review the subject matter taught until the details are fresh in the teacher's mind.

3. To determine what parts of the subject matter are most in need of emphasis for the given class.

4. To study the needs of those few pupils who are not reached by methods that succeed with the majority.

5. To organize the material to be studied in terms of the pupils' familiar experience.

6. To prepare exercise materials which stimulate and direct the pupils' thinking by reducing general textbook discussions to concrete situations or problems.

7. To estimate more closely what can actually be accomplished in the time available.

8. To relate assignments more closely to class work.

9. To prepare materials for illustration which would not otherwise be available when needed.

10. To call to mind before class several methods of developing a difficult part of the lesson so that the one of these methods that is best suited to the class response will be more likely to suggest itself in class.

11. To experiment with various procedures in teaching the same lesson and to record for future reference the extent to which each procedure succeeded in accomplishing the aims proposed.

You will note that each of the above "reasons for planning" is really an *effect of good planning. Consider each of these effects with some care. Then*

1. List by number (about) five of these effects of planning which you consider most important for secondary education as a whole. Be prepared to justify your selection by evidence from high-school teaching you have observed.

2. List by number (about) five of these effects of planning by which your own classes might profit most, or by which a class you are observing might profit.

3. List any of these so-called "effects" which you do not believe the mere practice of planning lessons *is* likely to produce. Give your reasons briefly.

Section III: What Elements in the Lesson Should the Teacher Plan?

It has been stated above that the merits of any lesson plan can be judged only in terms of the needs of the teacher who uses it. No single outline nor list of elements can, therefore, apply to all plans. But such a detailed list of elements can serve a useful purpose if it suggests elements which it is more useful for a certain teacher to plan than those he has planned previously. Compare, for example, the following outline proposed by Burton[1] with the sort of plan you make for your own use:

LESSON PLAN OUTLINE

I. Subject Matter:

A. The teacher's aim:

General: General topic being studied.

Specific: Part involved in this lesson.

B. What is to be taught? (Give here a list, outline, or brief of the subject matter for the lesson.)

(a) Old knowledge: Material already known to pupils, and which will be used in introducing the aim or setting up the problem.

(b) New knowledge: The material to be learned.

C. List sources and references used, both by teacher in preparation and those to which pupils will be referred. Note tools and materials that will be necessary and that must be ready for the lesson.

II. Methods:

Write out in some detail your procedure in teaching this lesson. Use the formal lesson steps where they are of help but disregard them if they interfere. Include both questions you will ask and the answers you expect. Make prominent the intro-

[1] W. H. Burton, *Supervision and the Improvement of Teaching* (1922), p. 336. Quoted by permission of the publishers, D. Appleton & Co.

duction of the pupil's aim; show how you expect to provide for possible wrong answers likely to come up; how you will introduce new material, summarize, provide drill, stimulate thought; how you will make the assignment, etc. In short, indicate in this part of the lesson plan about what you expect to do and say while before the class.

Assuming that the primary purpose of lesson planning has been accomplished when the material is organized into teachable form and the teacher has been through the subject matter at least once from the teaching point of view, *consider the above outline as follows:*

A. Is this form of plan better suited to the needs of a beginning teacher or to the needs of an experienced teacher? Why?

B. Which of the elements in the above outline do you think you should plan every day? Check them.

C. Which of these elements you have checked do you think are worth writing down?

Selection of elements to be planned. — Read through the following list of elements in the teaching of any lesson. List by number such of these elements as you believe can be planned with sufficient advantage *to you* to justify the time required to plan them. Then make a second list of such elements as you think you should *write out* for each lesson. Make both lists adequate but as short as possible.

The lesson plan for use in high school may include the following elements:

1. A statement of the aims in studying the general topic or unit of the course.

2. A statement of the aims of the particular lesson; *i.e.* why the lesson should be studied.

3. A statement of the pupil's aims in the particular lesson; *i.e.* what the pupil should be expected to do.

4. An outline of the essential points in the subject matter covered.

5. Notes of significant details which the teacher is likely to forget.

6. A series of exercises or problems which interpret the subject matter concretely in terms of situations familiar to the pupil.

7. Pivotal questions prepared in advance to stimulate the pupils' thinking and to develop the topic psychologically.

8. Notes of pictures, maps, and other illustrative material to be used.

9. A statement of summaries to be written on the board so that pupils may know definitely what conclusions have been reached.

10. A time allowance for various parts of the lesson.

11. A statement of instructions for the preparation of the next assignment to be dictated or placed on the board.

12. A record of results after the lesson has been taught and suggestions for improvement when the lesson is taught again.

Relative importance of elements. — After you have listed such of these elements as you think might be included in your plans to real advantage, select six or more from this list which you think should be planned either mentally or on paper by high-school teachers in general. Base your selection upon what you consider to be the most general defects in high-school teaching as you have observed it and as described in current professional literature.

Section IV: Construction of Lesson Plans

A. Take ten or more minutes to outline a lesson you have recently taught or one that you have seen taught or one that you might teach. Select a perfectly definite unit of subject matter. Your outline should contain answers to the following questions:

1. Exactly what did (or should) the teacher try to accomplish in this particular lesson?

2. What types of response did (or should) the teacher expect the pupils to make during the period: to appreciate, to memorize, to practice skills, to understand new material, or to solve problems by reasoning?

3. How did (or should) the teacher try to produce this response? By what approach to the topic, by what exercises or problems, by what selection of subject matter, or by what pivotal questions?

4. What results were (or should be) obtained by the majority of pupils?

When you have drafted your outline, exchange it with another teacher of the same subject and criticize the other's outline by answering "yes" or "no" to the following questions regarding it. Then return the outline to its owner with your criticism.

a. Is the aim so clearly stated that it would be understood by the pupils if written on the board as it stands?

b. Do you consider the aim worth accomplishing?

c. Are the types of response, mentioned in reply to Question 2 above, appropriate to the aim of the lesson?

d. Do the procedures, mentioned in reply to Question 3 above, seem as likely to produce these responses as others you might propose yourself? Offer suggestions.

e. Does the reply to Question 4 above indicate that the teacher knew what the results were?

B. From a high-school course that you are teaching or observing or expecting to teach select one topic that you consider somewhat difficult to teach. Prepare a plan for the teaching of this topic that can be covered in one class period. Construct the plan for your own use exclusively, not for exhibition purposes, but include the elements from the list on pp. 144 f., which you have decided to be worth including. Try to make this plan in the time you ordinarily have to prepare for each class period in the subject.

C. Check this plan, when you have completed it, by listing such of the "effects of planning" found on pp. 141 f. as your plan seems likely to accomplish.

Section V: Criticism of Plan of Chapter

Criticize the plan for this chapter as outlined in Section I by stating briefly to what extent the procedures followed have succeeded in accomplishing the aim.

Do you consider that the teacher who does not follow closely the plan prepared in advance has wasted his time in preparing it? Discuss your answer.

Selected References

Parallel References for Group Study

W. W. Charters — *Methods of Teaching* (1912).
Chapter XXV presents an outline for a lesson plan which is extremely flexible and probably as useful as any such ready-made outline can be.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapter XVI suggests important elements in the lesson which teachers may profitably plan. See also Appendix B for sample plans in various subjects.

L. B. Earhart — *Types of Teaching* (1915).
Chapter XV outlines plans of two types, — adapted respectively to the needs of experienced and inexperienced teachers.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter XIII discusses the lesson plan as one of several factors in the complete organization of the lesson.

C. E. Holley — *The Teacher's Technique* (1922).
Chapter XVII distinguishes important elements in the lesson plan and contains suggestive plans, many in high-school subjects.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter XXI outlines the conclusions in regard to lesson planning which the author has reached in connection with practice teaching courses.

G. D. Strayer — *A Brief Course in the Teaching Process* (1911).
Chapter XVI places considerable emphasis on written plans and the form of arrangement.

Supplementary References for Individual Selection or Assignment

A. R. Mead — *Learning and Teaching* (1923).
Pages 251 f. suggest the importance of planning lessons so as best to attain psychological objectives, rather than to attain subject-matter objectives. The teacher should plan his work in order to achieve certain habits, skills, ideals, etc., rather than merely attempt to teach so much Latin, mathematics, etc. Further investigation of lesson planning may well follow this lead in connection with the various lesson types, which see in this text.

Additional References to be Supplied by the Instructor

CHAPTER X

THE LESSON ASSIGNMENT

"The common practice of using the class period for mere repetition of material learned in the textbook is one of the most pernicious sources of waste and lack of interest to be found in the schools." Such aimless repetition of textbook material is almost inevitable unless the teacher takes time to organize the subject matter of the course into clearly defined units and then takes pains to show the pupils what to do with these units. To state this differently, efficient teaching demands that a course of study be organized in terms of useful activities and the pupils be shown in class how to perform these activities successfully. Where the bulk of the subject matter is contained in a single textbook, the teacher should assign only such passages for study as the pupils can use in accomplishing some useful purpose or performing some useful activity. The teacher should then supply whatever explicit directions will help the class to use the material for the purpose designated.

In other words, the "pernicious source of waste and lack of interest" referred to above is really the aimless, vague, and otherwise ineffective assignment. Such ineffective assignments are most commonly due to four easily removable causes; namely, the teacher's failure (1) to plan the advance lesson so as to know how

to assign it, (2) to allow sufficient time for the assignment in class, (3) to appreciate the necessity for explicit directions, and (4) to provide for the needs of individual pupils when these are noticeably different from the needs of the majority.

This chapter is intended to help you prepare more adequate assignments by illustrating assignments of various types and offering suggestions that should prove useful in reproducing the best features of these types.

Section I: Types of Assignments

While from the pupils' standpoint there are probably as many different kinds of assignment as there are teachers, most assignments can be related to one of the three following types:

A. Textbook assignment. — Sequential references are given to a single textbook which pupils are expected to study until they have learned the material well enough to reproduce a considerable part of it; for example, conventional assignments in English literature, history, textbook science, and geometry. Reading assignments in foreign language are different in that they have a more definite purpose than the mere assimilation and memory of facts, but when class work is *confined* to translation of passages prepared out of class the effect is largely similar. Good assignments of this type have the merits of definiteness and simplicity. They require small effort on the part of the teacher and save the pupil time in handling materials. This type, however, is ineffective unless, as in the case of cursory novel reading, for example, the pupil knows what to do with the material without being told.

B. Topic assignment. — Single broad topics or questions (or lists of related questions) are proposed by the teacher for the entire class as the basis for a certain unit of work. The pupils are expected to consult selected references, perform experiments, or conduct other investigations for necessary information which they must organize themselves in order to explain the topic, answer the question, solve the problem, illustrate the principle, etc. Laboratory science, topical lessons in history, original propositions in geometry, and "set" themes in English composition are examples of this procedure. This type serves to stimulate reflective thinking and to teach the efficient use of books and other materials. It obviously tends to broaden the course, since topics are considered from various points of view. It also tends to furnish a useful purpose in the pupils' study and to supply the directions that are necessary in accomplishing the purpose. The form of this type of assignment which is easiest to give consists of a list of questions to be answered after the textbook has been read.

C. Coöperative assignment. — Various sub-topics or minor questions are selected or proposed by individuals or groups within the class according to special interests or difficulties. These are studied either in addition to or instead of a general assignment for the entire class. Such flexible courses as civics, general science, and practical arts encourage this type of assignment which can be employed with success in most high-school subjects to supplement work demanded of the class as a whole. This type is, of course, more difficult to give. It has advantages over type B in that it secures greater interest, provides for individual difficulties, and permits

the introduction of more material for enrichment of the course. Inasmuch as this type of assignment is most specific, its purpose is usually most clear to the pupil.

Section II: These Types Illustrated

To show more clearly how these typical assignments differ in their effects upon the pupil, the following assignments are based upon the same material and are somewhat superior examples of each type. Their application should be apparent to all other subjects which, like American history, require extensive reading. The subject is Colonial Commerce and Industry at about the Year 1763.[1]

A. Textbook assignment type. — Assume a 10 Grade class has received instruction in how to use the textbook during the first two months of the course. "Open-book" lessons have taught the importance of topical outlining, the use of "aids for study" as found in the text, the value of summaries, etc. The teacher is competent, but regards the textbook as containing as much material as can be "covered" in the course. The chapters are taken up in order and each chapter receives an equal amount of time.

Teacher says: "Next time we shall take up the commercial and industrial activities of the colonists. Study pages 101–109 in the text (Fite, *History of the United States*) and come to class prepared to discuss fully each of the topics of the outline, which is to be copied in your

[1] The outlines and references here given are based largely on those found in R. M. Tryon, *Teaching of History in Junior and Senior High Schools* (1921), pp. 60–62, here reproduced by permission of the publishers, Ginn and Company. See also pp. 238–244.

notebook as usual." (Assume that the outline follows the text closely.)

1. Manufacturing outside of the home.
    a. Restricted by England
    b. Hindered in other ways
    c. Chief products
        (1) From iron
        (2) From other materials
2. Household industries
    a. Where most active
    b. Effect on domestic life
    c. Chief products

(The following topics similarly outlined.)

3. Agriculture
4. Forest products
5. Fishing
6. Fur trade
7. Domestic and foreign trade

B. Topic assignment type. — Assume the class has received similar instruction in selecting materials and organizing data and that the quality of teaching is above the average.

Teacher says: "In our study of the colonial period we have considered the effects of British influence upon various factors in our national development. We are now to consider the significant effects of British influence upon colonial commerce and industry. The question may be stated like this, — 'To what extent did England's restriction of colonial commerce and industry underlie all other causes for the Revolutionary War?' Prepare to discuss this question fully in one week's time. The

following outline and references will be used to supplement the text. One topic will be taken up each day."

1. What restrictions were placed on foreign trade? *a.* Navigation acts *b.* Proclamation line of 1763 *c.* Greenville's policy	1. Thompson, *England's Commercial Policy*, pp. 91–95; Bogart, *Regulation of Colonial Commerce*, pp. 95–100; Calender, *Influence of Trade Laws*, pp. 88–94.
2. What restrictions on domestic trade? *a.* Transportation *b.* Articles of commerce *c.* English attitude	2. Hart, *New American History*, pp. 120–122; Thompson, *Local and International Trade*, pp. 87–91.
3. What was England's attitude toward non-domestic industries? *a.* The mercantile system *b.* Parliamentary prohibitions in 1694, 1731, and 1750	3. Bogart, *Colonial Industries*, pp. 53–63; Thompson, *Attitude of the Mother Country toward Colonial Manufactures*, pp. 73–77; Webster, *General History of Commerce*, pp. 342–350.
4. What was England's attitude toward colonial agriculture, fisheries, etc.? *a.* Her theory *b.* Encouragements *c.* Restrictions	4. Moore, *England's Policy Regarding Colonial Agriculture*, pp. 144 f.; Herrick, *History of Commerce and Industry*, pp. 281–283.

C. Coöperative assignment type. — Assume here that the major aspects of colonial commerce and industry that are historically significant receive adequate treatment in the textbook (*e.g.* Guitteau, or Muzzey, or Stevenson). The class has also been supplied with the four topics and references listed in assignment B above.

Teacher says: "A few of you have suggested to-day that the Revolutionary War would never have occurred except for England's interference with colonial commerce and industry. Let's discuss this next time. Everyone

will study the description of colonial commerce and industry found in the text with reference to this question. In addition the following will prepare to report on the references for topic I (reads names of two or three pupils who have not understood previous references to Navigation Acts, etc.), the following will handle topic II (reads names as before), these will take topic III, and these topic IV. The rest of you may propose your own topics or may choose from the selected list (see below) as usual. Prepare an outline of your report to hand in." (Teacher checks off such of the selected topics as are chosen and assigns the remainder, or the topics of the outline, to those pupils who do not volunteer. Collaboration between pupils of somewhat equal abilities is encouraged. These extra readings are never longer than ten pages and are often prepared in class where the teacher can assist in the organization of the reports. The teacher is available at conference period to recommend readings for original topics not given in class.)

SUGGESTED TOPICS [1]

Colonial development of one of the following industries: soap-making, candle-making, spinning, weaving, shoe-making, blacksmithing, pottery, household utensils, etc. (3 and 5)

Early New England Cod-Fisheries. (5)

Medieval Guilds. (1, 2, and 4)

The Lumber Industry and Shipbuilding. (5)

Stories of the Hudson Bay Co. (5)

Woman's Part in Colonial Industry. (3 and 5)

READINGS

1. Ashley, W. J., *English Economic History.*
2. Cheyney, E. P., *Industrial and Social History of England.*
3. Coman, K., *Industrial History of the United States.*
4. Monro, D. C., *A History of the Middle Ages.*
5. Wright, C. D., *Industrial Evolution of the United States.*

[1] The numbers in parentheses refer to the readings appropriate to these topics.

Section III: Criteria for the Assignment

The above illustrations are intended to indicate the different effects of these typical assignments upon a class rather than to propose any one type as ideal or even as decidedly preferable. *In general* the three types probably stand in order of increasing merit, but a teacher would naturally adapt the type chosen to the demands of class, schedule, and course. To judge the value of any particular assignment one must use other standards.

The following criteria are proposed for discussion:

1. Are the teacher's directions, whether oral or written, understood fully by each pupil in the class?
2. Is the purpose of the assignment entirely clear to each pupil in the sense that he knows definitely what he is expected to do with it and why?
3. Are the teacher's directions sufficiently detailed and explicit to teach the class how to use materials efficiently and to prevent pupils from wasting time in their search for materials?
4. Do the teacher's directions show how the material should be studied, *e.g.* what passages are to be particularly emphasized and which read rapidly, etc.?
5. Does the assignment arouse interest in the following class discussion?
6. Does it require only a legitimate amount of time from the pupil of average ability?
7. Does it provide for marked differences in ability and interest?
8. Does it require reflective thinking either in terms of the subject matter or in terms of related situations in the pupil's experience?

9. Is the work which the pupil is expected to do of sufficient value to him to justify the time and effort required to do it?

With regard to these criteria:

1. Consider their relative importance. Which three questions serve best to test the value of an assignment in the subject you teach? Which should you omit if these questions are to be applied to assignments in your subject? What other criteria do you consider equally important? Write down the revised list.

2. Answer "yes" or "no" to these questions as you have revised them with regard to each of the three assignments in Section II, taking each at its face value. Then rank these three assignments in order of merit as applied to your subject.

Section IV: Uses of These Types

It is not possible to specify the teaching objectives for which each of the assignment types illustrated above is most useful until such objectives have been determined by wide experiment with classes in each high-school subject. Pending such experiment, only general conclusions[1] can be drawn with regard to the uses of these types.

The textbook assignment will be found useful when the teacher's purpose is merely to indicate material which the class has already learned how to handle and

[1] These conclusions are supported by a recent study of the assignment as made by all the teachers of one medium-sized high school. Specimen assignments were analyzed on the basis of the types as defined above, and this analysis was checked by question-blank data secured from each pupil in the school. A. C. Felkel, *A Study of the Assignment in a High School of Approximately Six Hundred Pupils* (Master's Thesis, 1924): on file in the University Library, University of Pittsburgh.

which therefore presents no serious difficulties, — as in drill work in foreign language, mathematics, and other formal subjects. This type is also appropriate in teaching appreciations, as in history, English, or science, when the pupil is expected to get a perspective from rapid preliminary reading of material which later will be studied in greater detail.

The topical assignment serves the purpose of directing the pupil's effort toward essential problems or difficulties in the given unit which but for this direction he might evade or overlook. This type is therefore useful in the introduction of new material and as a basis for instruction in how to study.

The coöperative type is useful wherever problem teaching is appropriate and where provision for individual differences in ability and interest is particularly important.

Recorded experiments with each of these assignment types in the various subjects and by an approved technique are much needed at the present stage in the development of high-school teaching procedure. If a teacher does no more than use each of the types in the attempt to secure a desired result in the given subject, his conclusions regarding the relative merits of these types will repay the effort and will almost certainly increase his skill in obtaining a similar result in future.

Section V: Assignments for Study of the Assignment

In order to illustrate more clearly the different effects of various types of assignment, five assignments are shown below such as might be given to a class of high-

school teachers in training who are studying the assignment in course. Judge each of these assignments as though it were designed solely for your personal benefit. Ask yourself "Of what use is this likely to be to me?" *before* you consider the value of each assignment to the class as a whole as you are asked to do in connection with each.

Typical assignments illustrated:

1. *Assignment:* Study Colvin, pp. 236–243, noting particularly paragraph (b) on page 236.

Rating: List by number such of the criteria on your revised list or such of those proposed above as are satisfactorily met by this assignment.

2. *Assignment:* Each of the following references lays stress on different features of the assignment. Consult each reference briefly to discover what features are stressed, and come to class prepared to discuss the relative merits of each reference.

Burton — *Supervision and the Improvement of Teaching*, pages 176–186.
Colvin — *Introduction to High School Teaching*, pages 236–243.
Foster — *Principles of Teaching in Secondary Education*, pages 201–205.
Hall-Quest — *Supervised Study*, pages 143–153.
Holley — *The Teacher's Technique*, pages 73–77.
Miller — *Directing Study*, pages 147–152.
Nutt — *Principles of Teaching High School Pupils*, pages 252–258.
Parker — *Methods of Teaching in High Schools*, pages 418–427.

Rating: List criteria by number as above.

3. *Assignment:* Colvin says (p. 239): "While no general rule of procedure can be laid down, it is safe to say that in the average high-school class from one quarter

to one third of the time of the recitation should be given over to the work of preparing the pupils for the new materials that they are to take up." In 200 classes observed by Colvin assignments were made as follows:

"Take the next ..... pages for to-morrow's lesson".....	93 teachers
Similar brief statement of work to be done.....	9 teachers
Some attempt to show how lesson should be studied but no more than ten minutes used for this....	86 teachers
Instructions in how to study lasting more than ten minutes.....	12 teachers
	200 teachers

If possible observe ten classes (or consult ten teachers) in subjects similar to your own and note the time each gives to the assignment. Prepare to report on the relation you find existing between the value of these assignments and the time required to give them.

Rating: List criteria by number as above.

4. *Assignment:* On the basis of your general reading and experience organize your ideas for report upon such of the following questions as are related to real problems you have met in teaching, or to problems you find interesting:

a. Should bright pupils be required or merely allowed to do more work than is expected of other pupils?

b. Is a teacher justified in taking class time to give individual assignments to a few pupils — say to one third of the class?

c. What are the advantages and disadvantages of requiring pupils to write all assignments in a notebook?

d. Do you fully accept the statement that no teacher should assign an advance lesson before he has prepared it? To what extent do you keep two days ahead of your classes in this way?

e. What advantages and disadvantages has the project type of assignment as compared with the single textbook type of assignment?

f. Do you believe that better results are secured when pupils coöperate by covering different phases of a given topic? What disadvantages occur to you other than the effort required of the teacher to plan such assignments?

g. "The chief function of the assignment is to teach the pupil how to study." Is this true in your experience? What objection do you see to devoting approximately one half of the period to instruction in the preparation of new assignments while the pupils are engaged in their preparation?

Rating: List criteria by number as above.

5. *Assignment:* Prepare material for three consecutive assignments in one of your courses and write out the general directions you would give to the class as the assignments are made. Your purpose is to specify the material to be learned and to give specific directions that will help the pupils to learn it. In so far as possible, make each of these assignments meet all of the criteria you have proposed on the basis of the eight questions on pp. 156 f. Be careful to select the type of assignment with reference to the uses of each type as outlined in Section IV, pp. 157 f.

Rating: List criteria by number as above.

Section VI: Criticism of This Chapter

Regarding this entire chapter as an attempt to direct your study of the given procedure, and in this sense as an assignment, which of the criteria proposed on p. 156 does it fail to meet? Which of your own criteria does it fail to meet? How might these deficiencies be remedied?

Section VII: Specific Application

Prepare assignment 5, Section V, as adequately as you can for the next meeting of this class. Write out only such parts of your assignments as are intended for the high-school class as a whole. Such instructions as you plan to give to individual pupils should merely be described in general terms.

Selected References

Parallel References for Group Study

J. Adams — *Modern Developments in Educational Practice* (1923). Chapter VII discusses the assignment procedures involved in the Dalton plan from a critical standpoint.

W. C. Bagley — *The Educative Process* (1905). Pages 317–19 define the function of the study assignment.

W. H. Burton — *Supervision and the Improvement of Teaching* (1922). Chapter VIII distinguishes, illustrates, and criticizes various types of assignment.

W. W. Charters — *Methods of Teaching* (1912). Chapter XXIV reproduces and interprets an assignment in history in order to develop useful considerations regarding assignments in general.

S. S. Colvin — *Introduction to High School Teaching* (1917). Chapter XI deals with the use of textbooks and note-taking as related to effective assignments. See also the assignments in Appendix C.

E. Dewey — *The Dalton Laboratory Plan* (1922).
Read the specimen assignments pages 53–63, and Chapter IV, which takes up other features of the plan as applied to high schools.

L. B. Earhart — *Types of Teaching* (1915).
Chapter VIII outlines clearly the important features in a good assignment.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Pages 201–205 discuss the time of giving, the definiteness, and the motivation of assignments.

J. R. Grant — *Acquiring Skill in Teaching* (1922).
Pages 139–142 contain a list of true-false statements concerning the method of making assignments. Useful for group discussion.

A. L. Hall-Quest — *Supervised Study* (1916).
See page references under assignment in the index. Note especially the discussion of the coöperative assignment in Chapter VIII, and as illustrated in the study of civics, pages 278–286.

H. G. Lull and H. B. Wilson — *The Redirection of High School Instruction* (1921).
Pages 96–133 describe procedures in problem teaching in junior high-school subjects and illustrate several suggestive assignments in connection with the study of problems described.

A. R. Mead — *Learning and Teaching* (1923).
Pages 249 and 258 f. state the threefold function of the assignment in one paragraph, submit helpful exercises for discussion, and supply various important references to discussions not here listed.

H. L. Miller — *Directing Study* (1922).
Pages 144–172 discuss the "indeterminate character" of the assignment and the necessity for individual variation. Abundantly illustrated in high-school subjects.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Pages 397, 447. The first of these references urges the necessity of beginning work upon the assignment in class. The second stresses the importance of "talking over" the assignment.

G. D. STRAYER — *Brief Course in the Teaching Process* (1911). Chapter VIII discusses the assignment briefly in connection with the Study Lesson.

WILSON, KYTE, and LULL — *Modern Methods of Teaching* (1924). Chapter XIV distinguishes the page, topical, and coöperative types of assignment, illustrates them by stenographic reports of classroom discussion, and emphasizes the significant principles involved. The illustrations are taken from elementary school practice.

Supplementary References for Individual Selection or Assignment

Individual investigations of this topic should be made in connection with some one type of lesson, for the purpose of determining the form of assignment which seems best to produce the desired result. Specific references may be found in the chapters devoted to particular lesson types, pages 203, 292, and 269.

Additional References to Be Supplied by the Instructor

CHAPTER XI

SUBJECT MATTER AND THE COURSE OF STUDY

The function of subject matter.

1. The principal of a high school in which you are seeking a position is interviewing you for the first time. He asks you to describe the material in your special subject which any ninth grade course of study should include. He suggests that you do this by naming several units of subject matter with reasons to show why each unit should be taught.

2. The principal of the high school in which you are head of your department has asked you to report on desirable revisions of the course of study. He wishes this report to contain a list of such subject matter units as you consider to be of more value than those contained in the textbooks used in the school at the present time. He naturally expects you to justify your selection of these units.[1]

Choose the one of the above situations which you are the better prepared to meet. If possible, outline the reply you would make to the principal. Otherwise, mention the more important considerations or criteria by which you would select these units of subject matter.

[1] See W. E. Stark, *Every Teacher's Problems* (1922), The American Book Co., pp. 91–95 and 111–115 for other suggestive problems of this nature applied to various high-school subjects.

Section I: The Teacher and the Course of Study

What the teacher teaches and *how* the teacher teaches are equally important. Every teacher should, therefore, be frequently challenged to defend his selection of subject matter. When such challenges do not come from supervising officials, they should be faced in the planning of each day's lessons. That is, the high-school teacher should make it his business to decide what each of his classes most needs to learn in the given subject and should be prepared to convince others that his decisions are sound. No skill in methods of teaching can compensate for inappropriate subject matter, and any subject matter is inappropriate until the teacher sees its relation to the needs of the pupils.

What the class most needs to learn is always indicated to some extent by the course of study; but whether this indication is helpful or not depends upon how the course of study has been constructed. Where teachers are encouraged to work out their own courses progressively under expert supervision, each teacher is likely to see the connection between what he is expected to teach and what the class most needs to learn. When this connection is evident to both teacher and class, the ideal condition exists. In other schools where teachers are expected to follow textbooks or syllabi which they have not helped to select or construct, either of two unfortunate conditions may result. The materials contained in the textbook or syllabus may be so largely formal and ineffective that the teacher loses interest in the course; or the materials may appear so excellent that the teacher

takes their value for granted, uses them as a crutch, and makes no effort to estimate their relative values. In each case the teacher's clear duty is to use the course of study for what it is worth and then to justify such departures from it as the needs of the class require. Any intelligent supervisor will encourage such departures when the teacher can *prove* their value. He should not encourage them otherwise.

The teacher is always responsible for the subject matter he teaches, no matter how ironclad the course of study may be. Hence, the ability to meet this responsibility is one of the most important of the high-school teacher's qualifications, particularly at the present time when the content of the various subjects is undergoing such careful scrutiny. It is, therefore, essential that the teacher be able to reach sound and independent conclusions with regard to each of the questions below as applied to each of the courses he teaches. *Study the following questions:*

1. For what purposes should this particular class study this subject: — that is, which of the possible values of the subject are most important for this group of pupils?

2. What parts of the subject help most to accomplish these purposes? — that is, what items of subject matter (chapters of textbooks, topics, problems, rules, principles, and other materials) are worth most intrinsically to the pupils concerned?

3. What organization or arrangement of these items of subject matter will best enable the class to learn them so as to accomplish the purposes of the course most effectively?

Apply each of these questions to one high-school course. Which of them can you answer to your own satisfaction? Which of your answers do you think you could make convincing to your principal? To the teachers of other subjects?

It is clearly impossible for all persons concerned to agree upon any replies to such comprehensive questions as these until certain criteria have been accepted which apply to *all* high-school subjects. An attempt to propose such criteria or bases for judgment is made in the following sections of this chapter.

Section II: How to Judge the Value of the High-school Course as a Whole

Criteria by which to evaluate high-school courses have been proposed by various writers. Several of these are discussed in the Selected References at the close of the chapter. For teachers in general the classification of values proposed by Inglis [1] and outlined below, is, perhaps, the most useful. The reader should be cautioned, however, against attempting to apply these values to any high-school course before he has studied the reference in the footnote and obtained a clear understanding of these values. Another caution deserves still greater emphasis to prevent unwise use of these criteria; namely, *the values listed below do not result automatically from the pupil's contact with appropriate subject matter, but only result from appropriate subject matter in combination with appropriate methods of teaching.* Algebra, for example, may be said to have certain values for a certain group

[1] A. J. Inglis, *Principles of Secondary Education* (1918), Houghton Mifflin Co. Chapters XI–XXI discuss the values of the various high-school subjects.

of high-school pupils; but whether these possible values become actual or not depends entirely upon how the subject is taught. With these cautions in mind, consider the following scheme of values in connection with one of the courses you teach or expect to teach:

Classification of values resulting from high-school courses

1. Direct and Specific Use Values (For example, practical arts courses)
   a. General Use Values (For example, social letter-writing)
   b. Specific Vocational Values (For example, stenography and typing)
   c. Preparatory Values (For example, first year course in foreign language)
2. Indirect and General Values (For example, academic courses involving the study of principles)
   a. Conceptual Values (For example, English literature, ancient history, and physics)
   b. Transfer Values (For example, instruction in how to study, English composition)

It should be particularly noted that the above values are so general that they give little help in the selection of subject matter until each has been reduced to specific classroom activities in the given course or subject.

Criticism:

1. Which of these values does this course of which you are a member actually possess for you? List them.
2. Which of these values can you prove to belong to one of the courses you teach or observe? List them in order of definiteness.

3. Which of these values does this course of yours clearly not possess for the majority of your pupils? Should the course possess these values?

Section III: How to Select Items of Subject Matter Most Useful in Securing These Values

When the teacher has determined as accurately as conditions permit which of the above values should apply to a given course, he should then regard these possible values as *aims*. He has next to select those items of subject matter, or those activities in connection with subject matter, which will best accomplish these aims and which can be properly taught in the time at his disposal. Even with the aid which modern textbooks afford, the scope of useful subject matter is so vast that, again, selection is impossible until criteria have been formulated.

The two criteria of most importance may, perhaps, be found in the following questions; whether applied to the course as a whole or to the content material of a particular lesson unit.

1. *What are the minimum essentials or items of absolute value?* The items of subject matter or activities for which *every* pupil has real use must always be included; for example, the principle of representative government in the teaching of history, and the application of this principle in electing pupil officers of school organizations.

2. *What are the additional essentials or items of relative value?* The items of subject matter or activities that are most useful *to the particular pupils concerned* should be selected in place of other items that may be more useful to pupils in general; for example, the course in introductory

science taught in an agricultural community would include items of subject matter and activities that would be out of place in the same course if taught in a city high school.

The distinction between these two criteria is clearly stated by Holley: [1]

> "Relative values are the values of the facts or items for this particular purpose, while absolute values consider the facts or items in all their possible aspects. . . . To illustrate, a certain set of peculiar marks may be very valuable to the printer and proof-reader; another set may be equally important for the rhetoric teacher who must mark English themes; but neither has the absolute value of ordinary punctuation marks, which are used generally. Each has a high relative and a low absolute value. When the printer says that every pupil ought to learn the marks he uses, because they are very valuable to him, he confuses relative with absolute values."

It should be evident that much of the controversy regarding the content of high-school courses arises from failure to recognize the equal importance of these two criteria, and from failure to apply *both* in the selection of any given unit of subject matter.

Criteria for selection applied:

A. Apply these criteria to the selection of units comprising the two courses outlined below. Since the units here listed are taken from textbooks, they are likely to have high absolute and low relative value for any particular class of pupils.

Check five of the eleven units in each subject which you consider most important for pupils in general to study. Then add about five more units of your own which you think might prove more useful to the pupils of

[1] C. E. Holley, *The Teacher's Technique* (1922), p. 49. Quoted by permission of the publishers, The Century Company.

your home community in each of the two courses. For example, the course in government might well include a study of party platforms, the actual achievements of recent administrations, state industries and their needs, and the like; while to the course in general science might be added such topics as the gas engine, the fertilization of soil, and other activities of local importance. It is to be expected that these units you supply yourself will overlap the others to some extent. When you have followed the above instructions, make a final list of ten units which you think each course should best include. Select these ten units both from the eleven here listed and from the five you supply.

STATE GOVERNMENTS [1]	GENERAL SCIENCE [2]
1. Origin of State Governments	1. Gravitation
2. State Constitutions	2. Molecular Attraction
3. The State Legislature	3. Conservation of Energy
4. The State Executive	4. Heat
5. The State Judiciary	5. Radiant Heat and Light
6. The Police Power	6. Sound
7. Crime and its Punishment	7. Magnetism and Electricity
8. Public Charities	8. Electricity, Its Uses
9. Control of Economic Interests	9. Mingling of Molecules
10. Public Education	10. Chemical Change and Energy
11. State Finance	11. Solution and Chemical Action

B. List in the same way the items contained in any lesson you have taught or a lesson you have observed which have high absolute value and those which have high relative value in terms of the activities in which the given pupils will actually engage. What items should have been rejected?

[1] W. B. Guitteau, *Government and Politics in the United States* (1916), Chapter Headings of Part II. Quoted by permission of the publishers, Houghton Mifflin & Co.

[2] C. W. Washburne, *Common Science* (1920), Chapter Headings quoted by permission of the publishers, The World Book Co.

C. Refer to pages 35 f. and note the list of units proposed for this course. How successfully do you think the two criteria discussed above have been applied in the selection of these units?

D. Mention one item of the subject matter contained in this chapter up to this point which has high absolute value; that is, which constitutes a "minimum essential" in the discussion of this topic. Mention one item which has high relative value; that is, which applies particularly to your personal needs or interests. Mention any items which you think are not justified by either of these criteria.

Section IV: How to Organize the Selected Items of Subject Matter So That They Can Be Most Easily Learned

The manner in which related facts are grouped for teaching purposes largely determines what the subject will mean to the pupil. The teacher's skill in grouping or organizing the items of subject matter in such a way that the pupil will learn the subject most easily and will use what he learns most readily in life situations, is, therefore, of supreme importance. This skill is most evident when the selected items are organized *both* in terms of the pupils' experience and in terms of the subject as the specialist knows it. Generally speaking, the more elementary the course, the more the learner's everyday experience should serve as the basis for organization. In no case should any unit of subject matter be isolated. Each unit should have meaning in terms of what the pupil already knows and form part of larger and still larger units as the course develops.

Criteria for effective organization of subject matter may be suggested by the following questions:

1. *Are the units of subject matter organized psychologically; that is, in terms of the pupil's previous experience?*

The psychological organization is employed in English composition courses when the pupil is taught to write his own social letters more effectively; in United States history when he studies the evolution of present day industries, political parties, schools, and similar institutions rather than a series of military and political events that are unrelated to his personal experiences; in physics when he studies the principles involved in the operation of gas engines, sewing machines, and other familiar mechanisms; in mathematics when he studies principles in terms of their applications rather than in the abstract terms of the science itself; etc.

2. *Are the units of subject matter organized logically: that is, in terms of the subject itself as the specialist knows it?*

The logical organization is conspicuous in plane geometry textbooks that are patterned after Euclid; and evident in most of the textbooks in history, science, English grammar, and foreign language. The logical organization is valuable as a basis for further study of the subject and for the selection of pivotal points in the development of a course. But where the two can not be harmonized, the psychological is the safer basis for organization in most high-school courses.

The distinction between these two types of organization appears in the following quotation from Dewey's *The Child and the Curriculum* [1] which may help to suggest the value of each type:

"Abandon the notion of subject matter as something fixed and ready-made in itself, outside the child's experience; cease thinking of the child's experience as also something hard and fast; see it as something fluent, embryonic, vital; and we realize that the child and the curriculum are simply two limits which define a single

[1] John Dewey, *The Child and the Curriculum* (1902), p. 16. Quoted by permission of the publishers, The University of Chicago Press.

process. Just as two points define a straight line, so the present standpoint of the child and the facts and truths of studies define instruction. It is continuous reconstruction, moving from the child's present experience out into that represented by the organized bodies of truth that we call studies."

The ideal organization of subject matter from the psychological standpoint is represented by the "project" method at its best. Essentially the project method consists in making a course of study consist of a series of useful activities which the pupil is taught to perform in the same way that he will have to perform them later. *In principle* it is safe to recommend this organization for any course of instruction in any grade of school. The project organization can not, however, become the rule in high-school practice until teachers become able to organize their own courses without dependence upon textbooks or until textbooks in each subject are written in terms of projects. For the present, at least, the project organization should be regarded as the preferred type of organization whenever the teacher seeks to stimulate reflective thinking. It is less useful in the teaching of appreciations and in drill work. And, finally, it should not be used regularly in place of the textbook organization except by teachers who have learned by experiment how to meet the various practical difficulties it presents.

The following quotation suggests clearly both the immense educational superiority and, to the experienced teacher, the serious practical difficulties of the project organization as compared with the logical organization in the teaching of natural science.[1]

[1] J. F. Woodhull, *The Teaching of Science* (1918), pp. 210–213. Copyrighted by The Macmillan Company. Reprinted by permission.

"A certain man became the possessor of a motor boat which filled his summer with projects for interesting study. . . .

"As one searching through an encyclopedia for certain information often gets sidetracked upon some other search, so this man spent many days or even whole weeks passing through one project to another. The mysterious action of the coil; the tracing of the current through its complete circuit; the timing of the spark by means of a commutator; the oiling devices; the circulation of water for cooling the engine; the clutch for engaging the engine with the propeller, to go forward or backward or stop. All these and many other projects seemed to him to be real physics; nay, more and better than real physics.

"A second man, possessing an automobile, pursued a dozen or two projects of study more absorbing than anything else which he had on his mind during the whole winter. With books of instruction furnished by dealers he studied carburetors, throttles, chokers, 'vacuum feeds,' high-tension magnetos, spark plugs, cooling devices, self-starting devices, differentials, clutches, gears, countershafts, breaks, etc. . . .

"A third man bought a small farm and began to read farmers' bulletins which he procured from the Government Bureau at Washington. For three months he was the butt of ridicule as a 'literary farmer,' but nothing ever took such real possession of his mental faculties as that project of making the ten acres produce all the grass it was capable of. In the course of a few years, according to an account which he published, the neighboring farmers were eager to learn how he had succeeded in producing seven blades of grass where one had previously grown. These studies appeared to him to be real botany, nay, more than botany, real science.

"A fourth man spent a few days at Mammoth Cave and came back with projects which seemed to him to be the most interesting studies in the fields of geography, geology, zoölogy, botany, physics, and chemistry. He was so enthusiastic over the results of these studies that they entered into every speech he made for the next year or so.

"A fifth man spent a summer by the seaside and heard faintly on a few occasions the sounds of a bell buoy anchored four miles

away. He reflected upon the problem of what conditions must obtain in order that that sound might carry so far. He questioned many men and read upon the subject until he got his mind possessed with an explanation which forms the substance of an interesting article.

"These five men, all intelligent men — at least they are professors — have testified that these projects furnished them exceedingly fruitful themes for study. They will not admit that those studies lacked organization nor that they were desultory and scrappy. None of them was prepared for these studies by specializing in those fields any more than Pasteur was prepared by his formal education for the six or eight great projects which made him one of the greatest scientists and the greatest Frenchman that has lived.

"Young people have plenty of projects which we may help them to study if we choose. It is not often possible to hinder their studying them if we will. They furnish the natural means for starting them on a scientific career. Why do we require young people in school to use a different method of study from that used by all of us outside of school? Why should we be averse to using methods of study in science which are considered eminently proper in other departments? Why should instruction be for specialization rather than for "magnanimity and enlightenment"? Why this mania for codifying subject matter which has cankered education during the last two decades?

"If the two or three hundred 'fundamental principles' in physics, for example, are fundamental, why do intelligent people having once learned them forget them without regret? Why do engineers have little use and much contempt for them? Why do those engaged in research in fields of physics ignore them? Is it tacitly for purposes of mental discipline that they are taught? Are students in schools and colleges made into scientists by learning the so-called fundamental facts, or by practicing the methods of a scientist in finding the solution of real problems?"

Discussion:

1. State such difficulties as you might anticipate in organizing a course you teach or observe *entirely* upon the project basis.

2. Which would you prescribe for the following pupils — the logical textbook organization of material, the psychological project organization, or both? State your reasons briefly.

a. A ninth-grade boy in a science course who expects to leave school at the end of the year.

b. A twelfth-grade girl in a millinery course.

c. A boy beginning geometry in the tenth grade who expects to go to college.

d. A girl beginning United States history in the tenth grade who does not expect to go to college.

3. Check or list the items of subject matter in this chapter which seem most useless to you. Do you think the presence of these items may be due to the writer's attempt to organize the material somewhat logically? How might the material in this chapter have been organized more psychologically for you?

Section V: Specific Application

Apply the criteria proposed in Sections II, III, and IV to one high-school course in your subject as follows:

1. List the values of Section II in the order of their practicability; that is, place first the value which you find most easy to secure, place second the value next most easily secured, and so on.

2. List about ten good textbooks in your subject, then relist them in order of the relative value of the subject matter to your particular class.

3. Select one of the following units, or propose one of your own, and describe how you would organize it psychologically for one of your classes. Indicate the

activity around which you would group the various items presented: —

a. Meter, Rhyme, and Verse Forms in English Poetry.

b. Burke's *Conciliation with America.*

c. The Industrial Revolution.

d. The American Reconstruction Period.

e. The Nature of Electricity.

f. The Chemistry of Metals.

g. The Area of Polygons.

h. Negative Exponents in Algebra.

i. Indirect Discourse in Latin.

j. Agreement of Relative Pronouns in French.

k. Inverted Order in German.

4. Outline in logical order the content of any lesson you expect to teach, or any chapter in the textbook. Reorganize this psychologically as you might teach it and show how you would relate the lesson thus organized to the following units of the course.

5. Make a list of *very specific* activities (*a*) which all of the pupils who study the subject you teach will have to perform in order to succeed in their probable future occupations and (*b*) which instruction in your subject should teach them to perform more efficiently.

Selected References

Parallel References for Group Study

W. C. Bagley and J. A. H. Keith — *An Introduction to Teaching* (1924).

Chapter III–V discuss the materials of education in terms of life activities.

F. Bobbitt — *The Curriculum* (1918).

A standard reference which deals with the organization of school work as a whole in terms of certain basic objectives.

W. H. Burton—*Supervision and the Improvement of Teaching* (1922). Chapter XII discusses criteria for the selection of subject matter in all grades.

W. W. Charters — *Methods of Teaching* (1912). Chapters IV and V discuss function of subject matter as a basis for selection. Chapters XIII and XIV discuss the organization of subject matter for the particular lesson. Chapter XXIII is concerned with the use of subject matter.

J. A. Clement — *Curriculum Making in Secondary Schools* (1923). A useful reference on account of its scope and summaries of other investigations. The later chapters deal with individual high-school subjects and are followed by reference lists that are worth particular attention.

S. S. Colvin — *Introduction to High School Teaching* (1917). Chapter XVI discusses the nature and importance of objectives in the daily lesson.

A. J. Inglis — *Principles of Secondary Education* (1918). Chapters XI–XXI set forth the values of various high-school subjects in terms of evidence available.

H. W. Nutt — *Principles of Teaching High School Pupils* (1922). Chapter VI briefly reviews the general theory with regard to the organization of subject matter.

S. C. Parker — *Methods of Teaching in High School* (1915). Chapter IV states requirements for the selection and arrangement of subject matter for teaching purposes.

Supplementary References for Individual Selection or Assignment

1. Principles and Technique of Curriculum Making

F. Bobbitt — *How to Make a Curriculum* (1923). Lists of objectives prepared by teachers of Los Angeles for the various high-school subjects are presented for further analysis.

F. G. Bonser — *The Elementary School Curriculum* (1921). A method of deriving a curriculum from major social objectives is discussed and illustrated.

W. W. Charters — *Curriculum Construction* (1922). The theory and technique of constructing curricula upon a scientific basis are explained and illustrated. (See pp. 325 f.)

G. C. Kyte — "The Coöperative Development of a Course of Study," *Educational Administration and Supervision* (1923), IX, 517 ff.

Describes the procedure followed in organizing committee work upon revision of courses of study in history.

H. G. Lull — "Uses of Community Resources in the Junior High School," *Teaching*, No. 66 (Feb., 1924), Kansas State Teachers College, Emporia, Kan.

This article contains specific outlines and directions for the teacher's use in collecting information regarding community activities and in organizing this material for teaching purposes. It also discusses the method of incorporating such material with the existing course of study.

H. C. Morrison — *The Teaching Technique of the Secondary School*, Edwards Bros. (1924).

Pages 71–73 distinguish the teaching unit from the subject-matter topic by contrasting the effects of each upon instruction. Helpful illustrations are given. Pages 87–90 describe various types of non-teachable material under the head of "educational journalism." The whole of Chapter V, in which these references are found, deserves careful study.

D. Waples — "Partial Reconstruction of the High School Course of Study," *School and Society*, XX, No. 498, pp. 56–59 (July, 1924).

A procedure is outlined by which a teacher can be guided in the effort to improve those parts of a given course of study which are poorly adapted to a given class. The article also contains a suggestion toward the organization of material in unit form.

2. Criticism and Evaluation of Existing High-school Programs and Courses of Study

F. Bobbitt — "The Actual Objectives of the Present Day High School," *School Review*, XXIX, 256–72 (April, 1921).

Presents data concerning the frequency of certain prominent objectives.

B. A. Bode — *Fundamentals of Education* (1922).

Chapters I–VIII examine the assumptions underlying construction of educational programs.

T. H. Briggs — "Curriculum Reconstruction in the High School," *School Review*, XXXI, 109–115 (February, 1923).
Presents the author's views concerning desirable emphasis of principles.

E. W. Butterfield — "The Program of the Small High School," *High School Quarterly*, VIII, 243–247 (July, 1920).
Presents curricular problems peculiar to the small high school.

J. A. Clement — "A Description and Evaluation of Published Secondary School Programs of Study." *Educational Administration and Supervision* (1923); Vol. IX, 235 ff.
States strong and weak features of such published statements.

—— "The Business of Scientific Curriculum Making in Secondary Education," *Educational Administration and Supervision* (1923); IX, 359 ff.
Presents certain theses and states the steps necessary in adapting curricula to existing needs in the particular system.

H. C. Hines — *Junior High School Curricula* (1924).
Chapters II–VII discuss the desirable contents of and methods of presenting the various junior high school subjects.

A. J. Inglis — *Principles of Secondary Education* (1918).
Chapters XI–XXI distinguish the factors which determine the value of programs of study as a whole and discuss the values of individual courses of study in the light of available evidence.

L. V. Koos — "The Administration of Secondary School Units" University of Chicago Press, *Supplementary Educational Monographs*, Vol. I, No. 3 (July 1917).
The organization and objectives of high-school subjects are discussed.

Ohio State Dept. — *Ohio High School Standards* (1923).
Chapters II, III, and V discuss briefly the more important considerations regarding junior and senior high-school programs and various fields of subject matter.

J. H. Rodgers — "Junior High School Curricula and Programs," *School Review*, XXIX, 198–205 (March, 1921).
General tendencies and common features are indicated on the basis of question-blank returns.

D. Snedden — *The Development of High School Curricula in the North Central States from 1860–1918* (1921).

Present tendencies are distinguished in the light of their origins.

F. R. Willard — "The Objectives of Education as a Basis for Curriculum Making in High Schools," *School and Society*, X, 9–12 (1919). Presents a general outline of the problem.

J. K. Van Denburg — *The Junior High School Idea* (1922). Chapters VI–XII discuss objectives in the constant junior high-school subjects. Chapter V discusses the program as a whole as developed experimentally in the Speyer School.

J. R. Young — "Reorganization of the High School Curriculum," *Educational Review*, LIII, 122–136. The writer defines the problem of reorganization.

See especially the reports of the N. E. A. Commission on the Reorganization of Secondary Education as listed on page 316 and also the starred references on the teaching of the various subjects on pages 317–320.

3. Selected Programs and (Published) Courses of Study

Alabama State Dept. — *Programs of Study and Standards for the Organization of Junior High Schools;* Department of Education *Bulletin*, June 15, 1921.

Berkeley, Cal., School Board — *Junior High Schools of Berkeley, Cal.*, Bureau of Education *Bulletin*, 1923, No. 4.

Chapter VI, pages 17–28, summarizes the objectives of the various courses of study.

Course of Study for High Schools, 1923.

English, History, Science, and Mathematics Courses of Study for Junior High Schools.

Boston, Mass., School Committee — *Course of Study in French and Spanish* (School Document No. 15, 1920).

Course of Study in Mathematics (School Document No. 14, 1920).

R. H. Bush — "The History and Social Science Curriculum of the Joliet Township High School," *School Review*, XXX, 665–670 (1920).

Chicago, Ill., Board of Education — *Syllabus in High School English* (October, 1920).

Syllabus in Languages — French, Spanish, Latin (March, 1922).

J. B. Davis — *High School Courses of Study* (1918).
The findings in the author's survey of New York City high schools are presented and analyzed.

Des Moines, Iowa, Board of Education — *History, Civics, and Economics for Grades IX–XII* (1922).
English for Grades VII–XII (1922).

Detroit, Michigan, Board of Education — *High School Handbook in English* (1921).

H. C. Hill — "Social Sciences in the University High School," *School Review* (1919). XXVII, 680–694.

Iowa Dept. of Public Instruction — *Syllabus for the Study of American History in the High Schools of Iowa* (1921).
Syllabus for the Study of Civics (1922).

C. H. Judd — "Report of the Committee on Social Studies in the High Schools," *School Review* (1920). XXVIII, 283–297.

Lansing, Michigan, Board of Education — *Latin, French, and Spanish for Grades VII–XII* (1923).
Science for Grades I–XII (1922).
History, Civics, and Economics for Grades V–XII (1922).
English for Grades I–XII (1922).

A. R. Mead — "General Plan for a Course in Economics," *School Review* (1922). XXX, 294–299.

New York City Board of Education — *High School Syllabus:* Advanced Biology for Academic High Schools (1919).

North Central Association — Report on English, *English Journal* (1922). II, 307–314.

Oakland, Cal., Board of Education — *Bulletins,* Course of Study Series.
No. 20, *Home Economics for Grades VII–VIII* (1923).
No. 51, *Mathematics as Related Subject for High Schools* (1923).
No. 3, *Language and Grammar for Grades* VII–IX (1921).
No. 42, *Chemistry for High Schools* (1922).
No. 15, *Spanish for Junior and Senior High Schools* (1922).
No. 12, *French for Junior and Senior High Schools* (1923).
No. 5, *Synopses of Courses of Study in History, Geography and Civics* — Grades VII–IX (1921).

Oregon, State Education Dept. — *State Manual:* Courses of Study for the High Schools of Oregon (1922).

O. E. Overn — "An Analysis of General Science Texts," *School Review* (1922). XXX, 254.

A brief description of the study and statement of main conclusions in an editorial note.

Pennsylvania State Dept. — *Manual for High Schools* (1923). Chapter IV outlines curricula and courses of study in brief.

Portland, Ore. — *Courses of Study in English for Use in High School* (1920).

Rochester, N. Y. — *Provisional Course of Study for Junior High Schools* (1919).

Each course is outlined in very helpful detail for each of four ninth-grade curricula. See also *Report on Junior High Schools* (1924).

P. Scott and O. Carr — "A Course of Study in Latin," *Classical Journal*, April, 1917. Pages 438–455.

E. H. Shidler — "Course in Modern Social Problems for High Schools," *School Review* (1920) — XXVIII, 615–626.

Springfield, Mass., School Committee — *A Manual for Teachers of English in the Central High School* (1921).

Texas, Dept. of Public Instruction — *Texas High School Courses of Study, Bulletin* 151 (1922).

Texas, University of — *Texas Mathematics Teachers' Bulletin*, University of Texas *Bulletin* No. 2306 (1923).

Vermont, State Board of Education — *High Schools of Vermont Manual: Courses of Study. Bulletin* No. 1 (1923).

Washington, State Board of Education — *Outline of High School Curriculums for the State of Washington.*

West Virginia, State Board of Education — *Courses of Study for the Junior and Senior High Schools of West Virginia.*

4. Problems in the Selection and Organization of Subject Matter

J. B. Edmonson — *Problems of Secondary Education* (1923).

Problems 6–10 concerning the administration of curricula are typical and worthy of consideration.

D. Snedden — *Educational Sociology* (1922).

Chapters XXXIII–XLIX present a stimulating list of problems involving the content of various high-school subjects.

W. E. Stark — *Every Teacher's Problems* (1922).
Chapters V and VI contain typical problems in subject matter selection.

Additional References to Be Supplied by Instructor

CHAPTER XII

SELECTING LESSON TYPES

The competent teacher selects methods as the competent workman selects tools — with reference only to the thing to be done. To select methods intelligently, the teacher must know what different types of methods there are and in what learning situations each type is most useful. The teacher should therefore learn first how to recognize these typical learning situations and should note the type of class response which each of these situations demands. He should then be more able to select those procedures which will produce the type of response desired. This chapter, accordingly, undertakes first to distinguish different types of class response, then to outline procedures by which each of these responses is produced, and, finally, to give practice in selecting procedures that are likely to produce useful responses in a given class and subject. This practice should also contribute to the teacher's use of these lesson types as each is studied separately in the chapters following.

Section I: Typical Pupil Responses

In distinguishing typical pupil responses that represent successive stages in the learning process, the present situation may serve as illustration. Assume that you who read these pages might read them for three different purposes. First, you might read them for a general

notion of what they are about;—the situation then would require what may be called a mere *appreciation* response. Second, you might read them as the writer intends that you should for the purpose of obtaining certain ideas that serve a useful purpose;—the situation then would require a *thought* response. Third, you might read them as the linotype operator does who sets the words in type without any attempt to follow the thought;—in which case the situation would require a mechanical *habit* response. In any life situation these three types of response — appreciation, thought, and habit — all appear to some extent, but one of the three is usually more apparent than the other two.

The types of response described. — It should be noted that these three types are here mentioned in a somewhat logical order. Generally speaking we "appreciate," *i.e.* "size up," those situations which we meet for the first time or those with which we are not likely to have much to do. We adopt certain attitudes toward these situations somewhat unconsciously, depending upon their relation to our immediate interests. Displays of novelties in shop windows, newspaper headlines, selections played by restaurant orchestras, and the like are situations which commonly require "*appreciation*" responses. In the same general sense, we think about and reflect upon those situations which we have "sized up" as important, and which can not be successfully met until certain decisions are reached. The amount of thinking we do depends upon how familiar and how important the situation is. Proposals of marriage, signing contracts to teach, and buying a new suit of clothes, represent situations of different degrees of familiarity

and of importance which require different amounts of thought. These commonly require the second or "*problem*" type of response. Finally, we practice upon situations which occur so frequently that the course of action previously decided upon by careful thought can be repeated almost mechanically. Routine correspondence, the eating of meals, and "small-talk" with casual acquaintances often represent situations of the third, or "*practice*" type, which anyone can meet who has once learned the correct procedure.

Section II: Analysis Applied to General Method

This brief analysis of typical responses to life situations bears various important applications to problems of teaching in the secondary school. Three of these applications are here outlined: — definition and significance of typical teaching procedures, the effect of subject and course on the selection of these typical procedures, and the effect of pupil-needs on the selection of these procedures.

A. Definition and significance of lesson types. — There are three types of teaching procedure which correspond to the three types of response just described; namely, "appreciation," "problem," and "drill" procedures. These three are generally recognized as having sufficiently different effects to make their distinction important. Each has a fairly definite technique. To this extent, therefore, the labeling of lesson-types is entirely safe. In the designation of other types than these three for use in all subjects, authorities are by no means agreed, as will be noted in the variety of types discussed in the Selected References at the close of this chapter. In the case of particular subjects this analysis

may be carried much farther to great advantage, but the present discussion is confined to procedures applicable in a measure to all high-school subjects. In actual practice, of course, even these three types are never entirely distinct. One can not drill upon a given rule without some appreciation of its value and some thought as to the best way of learning it. Yet in most teaching situations the emphasis given to one of these procedures is usually sufficient to identify the type.

1. *Appreciation type.*[1] By "appreciation" is here meant the process of forming attitudes, points of view, and the like toward situations presented in class. These attitudes may be emotional and express intense feeling or they may be quite the reverse — merely cold-blooded appraisals or estimates of the situation, such as one makes of an uninteresting lecture attended from motives of pure curiosity, or desire to obtain credit for a course. One who employs appreciation procedures in presenting a new topic to a class or in presenting a new phase of somewhat familiar material will not go far wrong. Such situations are too new or too vast or too vague to furnish material for problem solving and reflective thinking, and these should ordinarily precede drill. In opening a course, in the introduction of new topics, in references to outside material that widen the perspective of the course, in demonstrating a new laboratory technique, and the like, these appreciations are all important.

Certain requirements of the successful appreciation lesson are as follows:

a. The teacher must share the attitude himself which he wishes the class to adopt — whether this

[1] For illustration of this type of lesson see pp. 66–70.

consist in a belief in the value of the course, enthusiasm for a work of art, interest in the history of his subject (*e.g.* mathematics or science), sympathy for an unpopular cause, or what not.

b. The teacher must "motivate" full attention by appeals to curiosity, sympathy, or other motives that establish an appreciative class atmosphere.

c. So-called appreciation "lessons" in which the entire period is devoted to the development of these attitudes should be rare. Best results may be expected when the procedure is used incidentally to relieve the strain of problem solving or drill work.

d. The situation should be made as striking as possible by means of concrete illustrations — pictures, diagrams, vivid description, etc.

e. The situation must be presented in terms of familiar pupil-experience for utmost clearness.

f. The presentation should be informal and require no further analysis of content than is necessary to identify the situation and feel its meaning.

g. The presentation should seek to impress the pupil to such an extent as to stimulate further activity on his part. Where possible, it should help him to appreciate the importance of problems he is later asked to solve.

2. *Problem solving or reflective thinking type.*[1] The nature, importance, and scope of reflective thinking in all high-school work are perhaps obvious. The main steps in the appropriate teaching procedure are as follows:

a. Motivation, which results from a feeling of difficulty in the given situation.

[1] For illustration of this type of lesson see pp. 76–78.

b. Development and definition of the problem to be solved.

c. Collection of data bearing upon the problem

d. Organizing these data with reference to the given conditions.

e. Selecting the best hypothesis and applying this to the solution of the problem.

3. *Drill type.*[1] There is need for some drill (or practice) in most high-school subjects. The function of such practice is to develop skill in the performance of certain activities that are sufficiently important to justify the necessary expenditure of time. The main steps in drill procedure may be listed as follows:

a. Motivation, which shows the need for the skill to be acquired as a means of solving problems in the subject.

b. Planning practice exercises with reference to the learner's improvement.

c. Sufficient repetition to facilitate memorizing, but not too much.

d. Applying the skill in new situations to test its adequacy and show its value.

B. The effect of subject and course on the selection of lesson types. — This topic need only be considered here to the extent of pointing out a principle which in practice is often overlooked to the disadvantage of the teacher concerned. This principle stated in the form of a rule is — *teach a subject in the way it will be used.* Since it is apparent that no high-school subject

[1] For illustration of this type of lesson see pp. 72–74. Although the efficiency of the drill work here described is not to be questioned, the slave-driver methods here employed are not to be recommended.

will be used in the same way by all the pupils who study it, the best method of teaching can never be determined by the subject matter alone nor without reference to the needs of the given class. It is none the less true that the methods by which a subject is taught will determine the effect of the subject upon the pupil and this effect will decide what use the pupil later makes of the subject. A course in English literature that is taught for appreciation will, of course, produce an effect entirely different from that of another course on the same reading material which is largely given to drill upon names and dates and points of style. The effects of these two courses on the pupils concerned will be so different that *for them* the subjects themselves are different. The practical bearing of these facts on the selection of lesson types is simply that *the teacher should analyze his subject matter in terms of the most useful applications which his pupils are likely to make of it, and then employ such procedures in teaching the subject as will best help the pupils to make these applications at the time and in the future.* Stated conversely, the teacher should avoid the mistake of employing the lesson type which might be suitable if all pupils in the class were to apply the subject matter some day in the way that the teacher applies it himself. This mistake is made frequently enough to justify this emphasis.

C. The effect of pupil needs in selection of lesson types. — This all-important topic will be touched upon here only to the extent of naming certain points for later reference. Of chief importance is the familiar doctrine that groups of pupils in any high-school course differ widely in their needs for any particular kind of

instruction. Small class sections and a rich variety of courses will greatly reduce these differences in need in any particular class, but they can never be entirely eliminated. Even in highly specialized courses it is probable that a teacher must always face the problem of a compromise between the needs of different groups of pupils.

The following considerations may suggest to what extent the needs of pupil-groups may serve as a basis for the selection of lesson types:

1. There is great value in some estimate of the time the pupil will remain in school. Early leavers need be *drilled* in only such essentials as they can be taught to apply in the time available and as they will have occasion to apply after leaving school. This consideration gives strong support to such ninth-grade courses as general mathematics, general science, and general social science in which pupils may be led to appreciate the broader reaches of the subject, trained to recognize and perhaps to solve simple but important problems they will later encounter in these fields, and drilled in only such fundamental skills and knowledge as they will have most opportunity to apply. In a word, each of the lesson types above mentioned should have received about equal emphasis by the time a pupil has completed his study of any one subject.

2. For different groups of pupils who will probably complete the high-school course, such types of response should be stressed as are most likely to realize the values which the given subject contains for each group. Foreign language, for example, may for one group possess a real vocational value, for another group it may

be valuable as a means of further study in science or in history, for another it may lead to better understanding of the niceties of English composition, for still another group its value may amount to no more than the recognition of differences in modes of expression — a pure appreciation response. A definite working distinction between the probable values of each subject for different pupil-groups, is of great importance and should be acquired from a reading of such analyses as are supported by scientific evidence.[1] When the teacher has thus estimated the purposes which the course should serve for significantly large groups of pupils, he will naturally employ those lesson types which will help to accomplish most of these purposes most directly. That is, he will teach the subject in the way it will probably be used by each of the important groups in the class. These purposes will largely depend on the pupil's ability and on the quality of his previous work in the subject, since these combine to determine how the subject is likely to be used after leaving school.

3. High-school pupils differ widely also in their needs (for more efficient habits, for opportunities to do independent thinking, and for wider appreciations) *in general* and in connection with *all* subjects. This means that lesson types assume different degrees of importance in view of their intrinsic value to the pupils concerned. On these grounds it is suggested that drill methods are generally overemphasized; first, perhaps, because this procedure is the most definite and yields results that are readily tested; but also because by the time many

[1] For example, A. J. Inglis, *Principles of Secondary Education*, chapters XI–XXI. See also the preceding chapter of this text.

pupils reach high school they have passed the point of diminishing returns from drill work in subjects studied. Drill in the application of algebraic processes, for example, is for many pupils who have mastered arithmetic an unprofitable use of time; since only those who proceed farther in the subject will probably have occasion to apply these skills. Appreciations of mathematical functions and reflective thinking exercises with mathematical principles are more likely to prove helpful in life situations. Likewise on account of their vagueness and the great difficulty of teaching them economically, appreciations, no doubt, receive too little emphasis. The value of particular appreciations depends, of course, upon the extent to which they lead to fuller knowledge of the given situations; but mere contact with a variety of significant situations, properly presented, has its value none the less. This is particularly true with regard to vocational applications of the subject for early leavers. In adherence to drill procedure the scope of such contacts is often far too narrow. Finally, genuine reflective thinking upon subjects of real importance to the pupil is not likely to be overstressed. The pupil must, however, have the data upon which to reflect.

Section III: Test Cases

A. Professional courses. — The following paragraph quotes an outline of subject matter upon which candidates for a certain state high-school teaching certificate are required to pass an examination.[1] Read through these topics to see how many of them mean anything

[1] From a 1917 syllabus.

to you as a high-school teacher and to form a general impression of the probable value of this material to the candidates who pass a written examination upon it.

"*The general laws of method*

"The chief topics to be considered under this head are as follows:

> The acquisition of knowledge at first hand and at second hand; authority, observation, and experiment as means for acquiring facts; scope and function of observation; rules for making an experiment decisive; application of apperception, attention, and interest in acquiring knowledge; the problem as a device for focusing attention and securing educative thought; forms of solution — definition, cause or effect, classification and generalization, non-mathematical and mathematical; Mill's five methods of determining cause or effect; the media of instruction — oral versus book teaching, lectures, catechisms, pictures, models, maps, diagrams; the use of "types" in organizing and teaching subject matter; development lessons, inductive; stages in the inductive approach — problem, facts, hypothesis, cause and effect, classification, generalization and application; stages in the deductive approach — anticipation, use of deduction in gaining new knowledge or insight, and application in deductive lessons; educational value of verification; heuristic methods; use and limits of analysis and synthesis in teaching and their distinction from induction and deduction; invention as a mode of thought; the aims and scope of laboratory work as a principle to be observed in all studies; drills, reviews, and examinations."

Criticism. — Assume that the passing of an examination on all of these topics stands between you and the school position you wish to secure. Then *consider the following questions:*

1. Do you believe that the sort of knowledge which a person must have in order to pass an examination on

these topics would prove of much *practical* use in teaching?

2. Which of the three type procedures distinguished in this chapter would naturally receive most emphasis by an instructor whose course was organized to prepare for an examination on these topics?

3. How important do you consider it to be for the high-school teacher to "appreciate" the usefulness to him of the "laws" he is expected to study?

4. Is this "course of study" as above outlined likely to encourage a proper amount of reflective thinking? Does it encourage the instructor to teach the material in the way it will be used? What conditions would be necessary in order to make a course based on this outline apply to the classroom problems of the beginning teacher?

B. High-school courses. — About ninety pupils were taking the regular tenth grade course in English in a four-year high school of 425 pupils. These ninety pupils were about evenly divided among the three curricula offered by the school; namely, College-preparatory, General, and Practical Arts. A different teacher taught English in each of these curricula, but a ruling of the school board required that the course of study in English and history should be the same for all pupils. The principal of the school, however, had requested the three English teachers to adapt the uniform course of study so far as possible to the needs of the different curricula. The following outline indicates to some extent how these teachers varied in their class treatment of Dickens' *A Tale of Two Cities*. The numbers in the table indicate the number of periods which each teacher

gave to the various items listed. *C. P.*, *Gen.*, and *P. A.* indicate *College Preparatory*, *General*, and *Practical Arts* sections respectively.

Procedures Used in Class	*Sections*		
	C. P.	*Gen.*	*P. A.*
1. Reading the novel in class for general *appreciation* of the plot and characters. Questions on the main points only	4	4	5
2. Outside readings and written discussions of important social *problems* in connection with the French Revolution and similar modern *problems*	5	2	1
3. Detailed analysis of the plot, study of climaxes, and *drill* upon the outlined contents of each chapter. All chapter headings to be memorized	2	4	6
4. Character sketches both written and oral			
a. For *appreciation* of similar characters in modern life, by dramatizing dialogues, etc	5	2	0
b. For ability to solve *problem* of writing an accurate description of characters with the use of the book	2	3	0
c. For *practice* in writing from memory a list of the traits of each character	0	2	4
5. Detailed study of the facts of Dickens' life with dates	2	3	4
Total periods	20	20	20

Criticize the emphasis given to these different procedures as indicated by the number of class periods devoted to each procedure, assuming that most of the pupils in the College Preparatory section will enter college, that most of those in the General section will complete the high-school course, and that most of those in the Practical Arts section will leave school within two years. Base your criticism on the following questions:

1. Which of these three sections is most likely to want to read other novels by Dickens?

2. Which section is most likely to learn from the class work how to get useful ideas from other books?

3. In which section do you consider the time to have been spent to the best advantage of the pupils concerned?

4. How might these teachers have used these 20 periods to better advantage for their respective sections? Indicate a different emphasis of these procedures by changing the numbers in the table or by adding other procedures you think preferable.

Section IV: Specific Application

Select a similar unit of work from one of the courses you teach, or observe, or may teach. List five or more different procedures or lesson types that might be used in teaching this unit to the particular class and list them in the order in which you would employ them. Indicate what emphasis you would give each procedure by assigning weights to each on a scale of ten; that is, give the most important procedure ten points and the others less in proportion to their importance. In so doing, consider carefully the special needs of different groups within the class and state clearly *your reason* for the emphasis you give to the procedures you propose.

Section V: Criticism of Procedures Employed

Criticize this chapter by replies to these questions:

A. Does this chapter as a whole lay greater stress on appreciation of general principles, on reflective thinking, or on a mastery of facts?

B. How should the emphasis placed in this chapter upon the three following type responses be changed in

order to make the chapter of more value to you or to the class as a whole?

1. Explanations to be read and considered which suggest helpful points of view or appreciations.

2. Questions intended to raise problems in your own teaching which require reflective thought.

3. Statements of significant facts and rules which it would seem best for you to memorize, for example — the outlines of the three type procedures on pages 190 to 192.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).

Chapter XI distinguishes a variety of lesson-types, largely on the basis of elementary school procedure.

S. S. Colvin — *Introduction to High School Teaching* (1917).

Chapters VIII–XIV reduce teaching procedures to three — the addition of new knowledge, drill, and testing.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).

Chapter III, Section 4, distinguishes five "modes" of instruction.

P. Monroe — *Cyclopedia of Education* (1910).

See Suzzallo's article on "Types of Teaching," which summarizes various points of view.

S. C. Parker — *Methods of Teaching in High Schools* (1915).

Chapter V outlines another list of types which the author believes most significant in high-school teaching.

Supplementary References for Individual Selection or Assignment

L. B. Earhart — *Types of Teaching* (1915).

Chapter IV distinguishes some ten lesson types that are common in elementary school practice. Each of these types is discussed in a succeeding chapter.

A. R. Mead — *Learning and Teaching* (1923).

Chapter XIV distinguishes some eight teaching procedures and discusses these in terms of their psychological requirements

H. C. Morrison — *The Teaching Technique of the Secondary School*, Edwards Bros., 1924.

Chapter V distinguishes the following types on the basis of teaching objectives and characteristic features in the learning process: the science type, the appreciation type, the practical arts type, the language arts type, the pure practice type. Each type is well illustrated.

H. W. Nutt — *Principles of Teaching High School Pupils* (1922). Chapter IX describes various phases of classroom technique.

G. D. Strayer — *Brief Course in the Teaching Process* (1911). Chapter I discusses lesson types as distinguished by the teacher's aims.

G. D. Strayer and N. Norsworthy — *How to Teach* (1916). Chapter XIII describes very briefly the requirements of various lesson types.

G. M. Wilson — "Discussion of Dr. Kilpatrick's Paper on the Project Method," Society of College Teachers of Education, *Educational Monograph* No. XI (1922), pages 58–62.

The analysis which the present writer has employed in the foregoing chapter is here presented and justified.

Additional References to Be Supplied by the Instructor

CHAPTER XIII

THE APPRECIATION LESSON

This chapter undertakes to present certain requirements that are generally useful in the teaching of appreciations.[1]

Appreciation defined. — Before reviewing these requirements of the successful appreciation lesson separately, it is necessary to agree upon what the term "appreciation" is to mean. Parker, for example, would substitute "enjoyment" for appreciation; but "enjoyment" is so similar in meaning to "motivation" that confusion still remains. Other authorities identify appreciation with attitudes that are highly emotional, but such definitions exclude the pupils' calm appreciations of new points of view and the like that are equally useful and far more readily produced in the classroom. It should be noted that this dilemma is solved by the art critic who recognizes a distinction between "æsthetic" and "technical" appreciations. The former is comparatively independent of knowledge whereas the latter is not to be had without knowledge of the object appreciated. We shall therefore use the general term with the former interpretation, æsthetic, since this appears more suitable as applied to the learning response with which we are here concerned. Thus, as defined in the previous chapter, "an appreciation" is a preliminary

[1] Previously outlined, pp. 190 f.

attitude or estimate upon which fuller knowledge of a given situation may be based. It is illustrated by what a pupil learns in a mathematics class from watching the teacher solve on the board a new type of problem, which the pupil could not hope to solve himself without many more such demonstrations and much actual practice. It is further illustrated by the class response to the presentation of any new material or to the presentation of old material in a new way, provided always that this response consists in "sizing up" the new experience for what it may be worth. This meaning is reasonably simple and includes most of what is usually implied in popular use of the term.

Procedures difficult to specify. — Of the three lesson types commonly distinguished; namely, appreciation, reflective thinking, and drill types — the appreciation type is, perhaps, least capable of being set off by itself. Appreciations must exist to some extent in both reflective thinking and drill teaching, since appreciations form so important a factor in motivation and motivation is essential in teaching of every type. On account of this overlapping, appreciation lessons as such cannot be restricted to any set procedure. Whether any given lesson is an appreciation lesson or not, depends more upon how the class responds than upon what procedure is followed. Even a drill lesson upon Latin verb forms, for example, may serve better to help certain pupils appreciate the distinctive features of the language than another exercise which aims directly to teach appreciations of these features. The explanation for this fact is simply that the method by which appreciations are best taught depends upon the type of experience to be appre-

ciated. Appreciations of the beautiful — of poetry, painting, and music — come best from association with people who enjoy these arts themselves and from passive contemplation; whereas appreciations of intellectual experiences require some effort of thought.[1] On account of this great variety in the procedures by which appreciations of different sorts may be taught, the following discussion makes no attempt to outline *specific* procedures. The attempt is rather to emphasize certain general requirements which successful appreciation lessons should meet. These requirements should in themselves suggest the specific procedures whereby desired attitudes are best developed in the given situation.

Section I: An Exercise in Appreciation

Seven general requirements are reviewed below. Each is followed by a passage, more or less relevant, which should help you to appreciate the requirement. Read the items in order with no more effort of attention than the passages themselves call forth.

1. *The teacher must share the attitude himself which he wishes the class to adopt.*

"Are you qualified to teach? Then you must have vicarious interests, and you can't get them up for the occasion; you can't produce any imitation that will pass even casual inspection. You have to come out of a place where not only the obvious realities, but also the mysteries and miracles and pageants and poetry of Things, of Days and of Nights, of People and of Events, of Water and Land, and every living thing and every dead thing, have been looming like mountains or nod-

[1] G. D. Strayer and N. Norsworthy, *How to Teach* (1917), Chap. VIII.

ding like flowers along your path. And into this path you invite your pupil.

"The centre of any subject, the place in which it shuts up its sweetness and its aroma, the place which contains *all* its significance, can never be reached except by an artist. The truth about that subject is the beauty at the heart of it, and the music and the radiant passion it actually contains. In other words, *Emotion.* And you of the cold eye and the colorless habit of life — shall you attempt this mission? Shall you, for a living, take the hands of class after class of little children, and lead them into places clammy with routine and barred with efficiency tests, and stale with the taints of modern industrial competition and the conventions of the social ritual?

"The test of wisdom is not found in the schools, says Walt, and never will be. But schools ought to start or stimulate a process that will grow into wisdom outside, or into understanding, which, with all our getting, we most need to get; or, at least, into a healthy curiosity for, and sympathy with, the things of the mind and the things of the imagination, past, present, and future. The teacher is he who, passing through the scholastic Valley of Mara, makes it a well." [1]

2. *The teacher must "motivate" full attention by appeals to curiosity, sympathy, or other motives that establish an appreciative class atmosphere.*

"It must be noted that a mere gathering of individuals does not necessarily form a psychological unit. At Charing Cross Station on a Bank Holiday there are

[1] From *Shackled Youth*, pp. 7 f. by Edward Yeomans (1921), and here reprinted with the consent of the publishers, The Atlantic Monthly Press.

gathered together some thousands of people; but they have all their own individual interests. Each is seeking out his own particular ticket office, his own particular platform, his own particular train, and his own particular corner seat, and pays no attention to other people, beyond getting out of their way. This is a mere assemblage of individuals. If, however, something out of the common should occur, something of general interest, such as the falling of a girder from the roof, the mass of people becomes inspired with a common interest, perhaps with a common purpose, and we have a psychological unit. Something new has come into the situation. The number of people has not altered, nor has the inherent nature of the individuals changed, but the crowd, as a whole, will now behave in quite a different way from what it did before."[1]

3. *So-called appreciation "lessons" in which the entire period is devoted to the development of these attitudes should be rare. Best results may be expected when appreciations are taught incidentally to relieve more laborious activities.*

In the course of an exercise in the solution of proportional problems in plane geometry, a pupil remarked that the algebra involved in such problems was much harder than the geometrical part of the proof, and went on to say that he could not see why algebra was not taught in the second year of high school and plane geometry in the first year. The teacher took this occasion to explain enough of the history of the two subjects to show why geometry has always been considered more advanced than algebra, even though the subject

[1] John Adams, *Modern Developments in Educational Practice* (1923), pp. 120 f. Quoted by permission of the publishers, Harcourt, Brace and Company, Inc.

itself is far simpler. The class seemed greatly interested. A visiting teacher, however, was later heard to remark that this part of the lesson was a pure waste of time.

A twelfth-grade class was studying the poetry of Robert Burns. In taking up *The Cotter's Saturday Night,* the teacher remarked very impressively that in Scotland this poem is considered sacred and is read, like the Bible, on one's knees. Certain expressions in the poem were then explained in order to make clear the reading of the poem. The poem was then well read. No further comment was offered either by teacher or class.

4. *The situation, experience, or principle should be made as striking as possible by means of concrete illustrations, pictures, diagrams, and vivid descriptions.*[1]

The photograph facing this page is a poor substitute for the real statue as a means of compelling the observer to appreciate the significance of *thought* as a factor in human progress. The original statue makes a far more striking impression, as one comes suddenly upon it in Paris on his way to the Pantheon, — the national shrine to French heroes. Yet even the photograph may convey an appreciation of the idea symbolized.

The following quotation [2] suggests the power of concrete verbal illustration in helping the reader to appreciate the *rate* of human progress:

> The whole existence of mankind is generally assumed to have lasted not less than 240,000 years. . . . If this period be represented by a day of twelve hours, then each hour would represent 20,000 years, each minute 333⅓ years. If we imagine that we

[1] The most readable as well as the most authoritative book on the subject of illustration is John Adams' *Exposition and Illustration in Teaching* (Macmillan), which see in the Selected References.

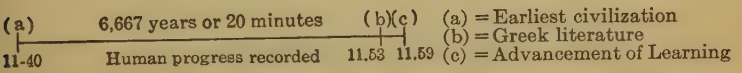
[2] John Adams, *The Evolution of Educational Theory*, p. 86. Copyrighted. The Macmillan Co. Reprinted by permission.

Rodin's famous statue, "The Thinker," symbolizes the basis of all social progress.

(From H. P. Fairchild, *Elements of Social Science* (1924), frontispiece, reproduced by courtesy of The Macmillan Co., publishers.)

of the present are living at noon on that protracted day, the startling fact comes out that *for over eleven and a half hours there is nothing to record.* At twenty minutes before twelve the earliest vestiges of Egyptian and Babylonian civilizations begin to appear. Greek literature is seven minutes old. At one minute before twelve the *Advancement of Learning* makes its appearance. The steam engine is only half a minute old. From this we get a vivid idea of two facts: first, the enormous period during which there was no progress recorded, and secondly, the exceedingly rapid progress during the final stages.

The appreciation of the above paragraph may be further clarified by the following diagrams:



5. *The situation must be presented in terms of familiar pupil experience for utmost clearness.*

"Nitrogen is free as air. That is the trouble; it is too free. It is fixed nitrogen that we want and that we are willing to pay for; nitrogen in combination with some other elements in the form of food or fertilizer so we can make use of it as we set it free. Fixed nitrogen in its cheapest form, Chile saltpeter, rose to $250 during the war. Free nitrogen costs nothing and is good for nothing. If a landowner has a right to an expanding pyramid of air above him to the limits of the atmosphere — as, I believe, the courts have decided in the eavesdropping cases — then for every square foot of his ground he owns as much nitrogen as he could buy for $2500. The air is four-fifths free nitrogen and

if we could absorb it in our lungs as we do the oxygen of the other fifth, a few minutes of breathing would give us a full meal. But we let this free nitrogen all out again through our noses and then go and pay 35 cents a pound for steak or 60 cents a dozen for eggs in order to get enough combined nitrogen to live on. Though man is immersed in an ocean of nitrogen, yet he cannot make use of it. He is like Coleridge's 'Ancient Mariner' with 'water, water, everywhere, nor any drop to drink.'"[1]

6. *The presentation should be informal and require no further analysis of content than is necessary to identify the situation and feel its meaning.*

THE AGE OF PERICLES [2]

(about 475 to 450 B.C.)

"A marvelous growth of the arts now flourished in Athens. Her citizens were free. Her slaves performed all labor. Her income from mines, trades, and tribute was so great that every citizen of intelligence could pursue any vocation he chose, supported well by the public funds.

"Pericles was the great man, who left his name stamped so deeply upon Athenian life that the period is called the age of Pericles.

"Pericles loved the arts, and gave rich rewards from public funds to painters, sculptors, builders, poets, playwrights, orators, and all who could contribute to the cultivated pleasure of the city.

[1] E. E. Slosson, *Creative Chemistry* (1920), pp. 24 f. Quoted by permission of the publishers, The Century Company.

[2] B. B. and E. Cobb, *Pathways* (1922), pp. 49 f. Quoted by permission of the Publishers, The Arlo Publishing Co.

"The tribute money, levied once to secure protection from Persia, was now used freely to make Athens a spot of enchanting beauty. She did her part in keeping the Ægean safe, and she claimed the right to use the tribute money as she chose.

"During this brief period of hardly twenty years, wonderful temples, statues, paintings, works of carving, and art of every kind were produced. Poetry and oratory rose to heights equalled hardly ever in the history of the world.

"The Athenian citizens were rich and free from labor.

"One would suppose this to be the most fortunate, the happiest city in the world. But in the midst of this good fortune, if an Athenian had been asked the question: 'Are you serving others, or making others serve you?' he must have answered, 'We are making others serve us.'"

7. *The presentation should seek to impress the pupil to such an extent as to stimulate further activity on his part.*

"If I were not engaged in this inferior business of teaching in a university, and my time were not all taken up with it, I should like to go into a high school where these formal prescriptions had been put aside and take charge of a class in English. I think I should talk to the pupils in some such way as this:[1]

"The classes of former years have been reading this prescribed set of books — a pretty poor sort of literature, in my opinion, and not proper for young people to read. You are very fortunate in being able to get rid of them. They are mostly very dull and uninteresting. There is

[1] From an address by F. N. Scott, quoted by S. C. Parker, *Methods of Teaching in High Schools* (1915), pp. 260f. Quoted here by permission of the publishers, Ginn and Company.

The Iliad, for example, full of fighting and blood and the killing of men, and of armies, clashing with one another in desperate conflicts where all the elementary and violent human passions are set free. Horrible! The International Peace Society can not approve of anything of that sort. We will put this book aside, and I hope none of you will touch it. Then there is the *Faerie Queene*, all about giants and maidens in distress, magic and mystery of all sorts — perfectly useless, a futile, silly thing, nearly as bad as the Arabian Nights. Don't go near it. I trust also that no one will attempt to read *As You Like It*, which has a wrestling match in the very beginning (these minor athletics ought not to be allowed in literature) and tells about a girl who ran off into the forest in boy's dress — a most improper performance on her part. I am sure we ought not to talk about such things in this class. And even worse, perhaps, is Tennyson's *Princess*, where a prince, who ought to know better, disguises himself in woman's clothing and gains admission to a girl's academy. A scandalous thing! No gentleman would act in that way. In short these books are all harmful and ought to be destroyed. For the present I will put them on the top shelf of the closet here, and just as soon as the janitor is at liberty we will have them burned.

"And now we are going to take up some books which I know you will enjoy. I want you to be just as enthusiastic as you can about them, for we are going to study them and study them hard, and you will get a great deal of profit out of them, and all will be greatly improved. For the boys we will take Captain Mayne Reid's *Afloat in a Forest*. We are going to read that book a paragraph

at a time and examine carefully every allusion in it. It is about some people who floated down the river Amazon. First we will draw a map of South America, locating the course of the river, and then we will ascertain how wide the Amazon is at various points and how fast the current moves. Finally we will determine the amount of silt which is deposited by the river at its mouth. Captain Mayne Reid, by the way, makes a mistake. He has three people float down in a much shorter time than they possibly could. You will see that this is so when we discover the exact relationship between the flow of the stream and their rate of progress. We shall go into these details with the utmost care, and after a little while you will write some nice little essays about them.

"For the benefit of the girls we will read in the same careful and scholarly way Robert Chambers' *Heart Throbs of a Multimillionaire*. We will determine just how many times the heart throbs when two hearts are in unison, and learn about the two kinds of blood corpuscles, and so on, and there will be essays on all these things also.

"But this is not all. Two years from now, when you are seniors, we will take these books up again and go over them and over them and over them until you know the answers to every last question in regard to all these mathematical, biological, chemical, and topographical things, and that will be absolutely delightful.

"I think we can all prophesy what would be the result of such an experiment. If the room were not locked or the closet door locked, after two or three weeks those classics which were put on the top shelf would

have to be rebound, and as regards the other books, when their very names were mentioned, I think the pupils would fly shrieking. They would never want to see the *Heart Throbs of a Multimillionaire* again, or even *Afloat in a Forest*, good as that book is."

Section II: Criticism

Write a brief comment on *each* of the items in the preceding section. Make your comments bear upon the following questions:

1. What is the relative value of the above passages? Indicate those which help you *most* to appreciate the importance of the requirements which the passages are intended to help you appreciate, and those which help you least.

2. If any of these passages did help you to a fuller appreciation of the requirements listed, in what did this appreciation consist? Try to state as definitely as you can *how* your attitude toward any one of these factors was affected by reading the passage relating to it.

3. Comment on the suitability of this kind of appreciation exercise for high-school pupils. Does the short oral explanation or lecture by the teacher, which these passages most nearly represent, constitute the best kind of appreciation exercise for high-school classes? Discuss its limitations and suggest other ways of teaching appreciations which you may consider more effective.

Section III: Specific Application

Select some single point of view or attitude that you should like the members of one of your classes to possess:

— such as, an appreciation of the full meaning of public service, in a class in community civics; an appreciation of the good sportsmanship of some character in fiction; an appreciation of conservation of energy in science; an appreciation of "function" in mathematics — and the like. Outline one or more procedures that you might follow in teaching such an appreciation. In working out these procedures keep in mind the requirements that have been stated above and meet such of these requirements as you think apply to the situation with which you are dealing.

Selected References

Parallel References for Group Study

J. Adams — *Exposition and Illustration in Teaching* (1913).
Chapters VII, XII–XVI supply striking examples of verbal descriptions, material illustrations, pictures, diagrams, and other illustrative devices.

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).
Pages 240–246 emphasize the importance of definiteness in teaching appreciations.

L. B. Earhart — *Types of Teaching* (1915).
Chapter X describes elementary school procedures in the teaching of appreciations.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter IX states five important requirements for the appreciation technique on which those mentioned in this chapter are largely based.

F. H. Hayward — *The Lesson in Appreciation* (1913).
Chapters I–VI present a highly suggestive account of appreciation lessons in which new materials are introduced to pupils as strikingly as possible.

C. E. Holley — *The Teacher's Technique* (1922).
Chapter IX analyzes the varieties of emotional response and outlines appropriate methods.

S. C. Parker — *Methods of Teaching in High School* (1915).
Chapter X mentions activities that are enjoyed by high-school pupils and shows their relation to class work.

C. D. Strayer and N. Norsworthy — *How to Teach* (1916).
Chapter VIII defines several important types of appreciation and discusses their importance in learning.

Wilson, Kyte, and Lull — *Modern Methods of Teaching*, 1924.
Chapter IX discusses the appreciation lesson in the elementary school. Principles are well stated and illustrated. A list of pupil activities which stimulate appreciations can well be adapted to high-school practice.

Supplementary References for Individual Selection or Assignment

A. R. Mead — *Learning and Teaching* (1923).
Chapter V discusses the psychology of appreciation and its bearing upon teaching procedure. The chapter references to forty-three titles should be consulted when time permits investigation beyond the scope of the references listed on this page.

M. D. Penrose — "A Lesson in Modern Magic," *The Atlantic Monthly* (December, 1923), VI, 786–787.
The article describes the conversion of an apparently unsympathetic and mechanically minded youth to an appreciation of modern poetry.

E. L. Thorndike — *Principles of Teaching* (1906).
Chapter XII describes procedures by means of which responses of feeling are best aroused.

Additional References to Be Supplied by Instructor

CHAPTER XIV

TRANSFER OF TRAINING

In what way may training be said to *develop* the mental powers? There is, perhaps, no standard book on the principles of education without its chapter in answer to this question. For this reason the present discussion is less concerned with recent investigations of the problem than it is with the teaching practices which these investigations support.

Transfer of training takes place when in learning to perform one particular activity, typewriting, for example, — the learner also improves his ability to perform other activities; as when learning to typewrite leads to some improvement in abilities to spell, to read accurately, to sit erect, to play the piano with a firmer touch, to focus attention rapidly, to use other machines skillfully, to carry out vocational ambitions, and to improvement in other activities which have even less to do with the specific performance of typewriting.

Significance of the theory. — To appreciate the bearing of this principle of transfer or formal discipline upon the selection of subject matter and methods of teaching in the high school, a brief reference to its past and present significance is necessary. The following account of Charters considers the principle as applying to the *selection of subject matter*.[1]

[1] W. W. Charters, *Curriculum Construction* (1922), pp. 23–25. Copyrighted by The Macmillan Company. Reprinted by permission.

"This principle of transfer of training has occupied an unenviable position in modern education. It has added no subject to the course of study. It has probably added no new methods of instruction, because the age at whose close it was elaborated is notable in education for its technique in obtaining thoroughness of instruction. The principle has been merely the bulwark of conservatism, the last argument — after others have failed — upon which to base the retention of subjects in the course of study or to oppose changes within the subject. It is an educational eddy in which many items of instruction have been held, which, in the ordinary course of educational progress, would long since have floated down into the ocean of oblivion. For it has appeared to be obvious that, if training is the end of education, and if it can be obtained in certain subjects, then, no matter how far removed they are from practical usefulness, it would be unwise to invite trouble and unrest by changing.

"At the beginning of the twentieth century the first serious attack upon the claim of wholesale transfer was made by Thorndike, and his criticism has since been elaborated by many investigators. Since that time the educational world has been superficially divided into three classes. Naturally there are those who view any attack upon the transfer of training with suspicion and in some cases with alarm. There is a second group, of very large proportions, that maintains essentially that there is no transfer. And there is a third group, the most constructive and powerful of the three, which is endeavoring to find just how much can be salvaged from the remains of this once magnificent structure, and be put to use. Thorndike says that there is transfer where

there is identity of substance and procedure; Bagley claims that ideals may be transferred, and Ruediger adds that this is particularly true if the ideals are made conscious; Colvin shows that many general habits can be transferred, when habits which are called general are really specific habits of general application; Judd holds that generalizations may be transferred; and other writers have made other additions.

"But whatever may finally be saved from the wreck — and at present the process of salvaging occupies the attention of those engaged in studying the subject — there is no doubt that wholesale transfer as the sole principle of selection of subject matter is permanently discarded. . . .

"The safe position for investigators to take in matters *concerning the curriculum* is that the training of abilities should be carried on in connection with material as close to normal situations as is possible. If memory is to be trained for use in practical situations, then it should be trained in material as nearly practical as possible. If discrimination in color is to be trained, exercises should deal with color and not be confined to the learning of discrimination through the study of technical points of language and grammar. The training should be given in situations as nearly normal as possible, and the supporters of any subject are wise when they assume that formal discipline is not one of the arguments in favor of retention of their subject. If this position is taken, other functions will be found which have an enriching influence upon the subject, and if by any chance there should be a large degree of transfer of training, it will be added as a value supplementary to the other values. . . ."

Section I: Procedures to Facilitate Transfer

The problem. — As applied to *methods of teaching*, the problem of making class instruction transfer to life activities outside the classroom is chiefly the problem of teaching pupils to generalize.[1] Not merely ideas may be generalized but also ideals, habits, methods of work, and other teaching objectives of which the pupil himself is made conscious. *To generalize is to discover the common elements in a variety of situations.* To teach pupils to generalize, the teacher must dissociate these common elements. This means that the teacher must make the pupil see the same element in many situations. *Three procedures are important.*

1. The teacher must first *break* those associations which in the pupil's mind *combine* all the elements in a given situation and prevent the pupil from analyzing the situation into its component parts. For example, *studying the lesson* to many pupils means simply "studying the lesson." They are unable to distinguish such elements as reviewing the assignment to find out exactly what is called for, forming a definite aim, outlining the reading matter, selecting important parts of it, and using these parts to accomplish the aim. When these elements have been pointed out in a number of lessons, the teacher can then show that certain of these elements are common to many situations other than lesson-studying; — forming a definite aim, for example, is an important element in most of the activities of life which are not purely habitual.

[1] See the specific requirements of methods by which generalizing is taught in Inglis, *Principles of Secondary Education*, p. 399.

2. The second procedure requires the teacher to give these common elements in a number of different situations a name. This enables the pupil to identify these elements more easily in new situations. Note this use of such terms as "the ideal of good sportsmanship," "the difference of two squares," "the tense of verbs," and the like, in the illustrations given in the following section.

3. A final procedure in teaching pupils to generalize is to give the pupils practice in applying the ideal, principle, habit, etc. to *new* situations.

Section II: Illustrating the Method of Transfer

This section contains material which is so arranged as to help *you* discover common elements in a variety of situations. It is intended to illustrate certain factors in transfer that have been mentioned in the preceding paragraphs.

A. Dissociating an ideal of good sportsmanship. — A rather moving story is told of Madame Disraeli, the wife of the famous British prime-minister, on the occasion of one of her husband's most important speeches in the House of Commons. It seems that she was so anxious to have her husband comfortably seated in the carriage in which they were to drive to Parliament that she allowed one hand to rest in the hinge of the carriage door as the footman closed it. Any unusual remark from her would have directed Disraeli's attention to her broken fingers and so have unsettled him for the important speech he was about to deliver. She, therefore, kept up an animated conversation on commonplace topics until they had reached their destina-

tion where the footman released her hand by opening the door, and her husband conducted her to the visitors' gallery. She then excused herself and retired to the privacy of a rest room, where she promptly fainted. The prime-minister did not learn of the fact until he had won the most significant debate of his political career.

Discussion:

1. What instances of heroism similar to this can you cite from your personal experience or from your general reading?

2. Do you consider the action of the many medical men who have died from experiments upon themselves in the interests of science, more or less heroic than the above?

3. Do you consider the college athlete who conceals a recent physical injury so that he may enter a game that gives him his letter, to be a good sport, or not?

Is the player a good sport who insists on finishing a game after he receives an injury when substitutes are available?

4. Was the "human fly" a good sport who fell ten stories to the street from the outside of a New York skyscraper that he was attempting to climb?

5. State simply a few of the more important traits which you think the good sportsman must possess.

B. Dissociating a rule in algebra. — Suppose a teacher of ninth grade algebra is "developing" the rule for finding the product of the sum and difference of two quantities. The first thing he would do would naturally be to tell the class what they are trying to find out; namely, a rule to save labor in multiplying the sum and difference of two quantities. He might then work

out the problem $(a+b)\ (a-b)$ on the board and point out that the cross products cancel and the final product is the difference of the squares. He might then ask the class to work out a number of multiplications, *e.g.* $(x+y)\ (x-y)$, $(4a+8b)\ (4a-8b)$, $(2m+n)\ (2m-n)$, etc., and have the results placed on the board like this:

$$x^2 - y^2$$
$$16a^2 - 64b^2$$
$$4m^2 - n^2$$

He might then ask the class to point out to him the common element in these results and to explain the application of the rule in each case. He might then set the class to work in applying the rule to a number of examples.

C. Dissociating the principle of tense in English verbs. — The following exercise for the teaching of tense is quoted from Thorndike, in whose *Principles of Teaching* many other excellent illustrations of these principles may be found. These the reader is urged to consult.[1]

"A verb may tell more than what somebody or something does or is. To-day we will find out one of the other things that a verb tells. Look at the verbs in the sentences below and see what the difference is between those in the first column and those in the second.

The boat went yesterday.	The boat will go next year.
She sang that song Sunday.	She will sing it again to-morrow.
They were sick last week.	They will be sick for a few days longer.

"Which of these verbs tell that something was in the past? Which verbs tell that something will be in the future?

[1] E. L. Thorndike, *Principles of Teaching* (1906), pp. 168–170. Quoted by permission of the author. See also pp. 135–146, 167–178 for further illustrations.

"Write two sentences about the action of a man going to New York. In the first tell about the man going to New York in the past; in the second tell about the man going to New York in the future.

"Look at these sentences:

1. The train is going sixty miles an hour now.
2. Hear how loud that bird sings.
3. They are sick.

"What other time is there besides the past and the future?

"Tell in the case of each of these sentences whether the verb expresses a past action or a present action or a future action.

1. He will knock at your door at four o'clock.
2. He knocked at my door yesterday.
3. They write during this period.
4. He wrote a letter in the evening.
5. The wheels go around very fast.
6. They went around faster the other day.

"What is the difference between the form of the verb 'knock' when it expresses or denotes future action and its form when it expresses or denotes past action? What is the difference between the form of the verb 'write' when it denotes present action and its form when it denotes past action? What word is used to tell about a person going in the past? To tell about a person going now?

"Verbs tell not only the kind of action or event but also the time when it takes place. The form of the verb is different when the action or event is represented in the past from what it is when the action or event is represented in the present or in the future.

1. A difference in the form of a verb to denote time is called Tense.

2. A verb that denotes present action is in the Present Tense.

3. A verb that denotes past action is in the Past Tense.

4. A verb that denotes future action is in the Future Tense.

"Write under each verb in the sentences below what tense it is in (as is done in the first line).

1. It is hotter this summer than it was last summer.
present past

2. It will be cold enough in the winter.

3. The sun will rise later and set earlier.

4. Evening came so soon last November that the lights were being lit in the house when I reached home from school.

5. We do not light them now till after seven.

6. You can see that it is quite light now though the bells are ringing seven.

7. Did they send up my trunk from the station?

8. No.

9. They would not promise that it should be sent without a check.

10. If you will send them the check, it will be sent.

11. I shall be passing the office this evening, anyway.

12. Won't it be open?

13. It used to be open evenings.

"Write two sentences each with a verb in the present tense.

"Write two sentences each with a verb in the past tense.

"Write two sentences each with a verb in the future tense."

D. Generalizing the method of dissociation. —

1. Compare the three exercises in A, B, and C, above and make a list of those features which are clearly common to all three.

2. To what extent were you conscious of these common elements as you read the exercises separately the first time?

3. How much help in distinguishing these common elements do you think you received from the preceding statement of "the principle of dissociation"?

4. Read over Section III below. Is this likely to give you sufficient practice in applying the principle of dissociation to make this instruction really helpful in your teaching?

Section III: Specific Application

1. List about three ideals to which one of the courses you teach may well be expected to contribute. Specify in connection with each a number of different class situations in which the particular ideal may be stressed. Suggest briefly the amount of transfer to be expected from the combined effect of these situations, assuming that each is successfully handled.

2. List such abstract and general values as are commonly claimed for the subject you teach or observe;

such as "training of the memory," "development of the observation," "culture," and the like. Check those which you believe the majority of your pupils realize to a considerable extent. Give reasons to explain why instruction in the subject is not likely to yield the other values claimed.

3. Select one of the following lesson topics, or propose one of your own, and work out in detail a series of exercises which will help your class to generalize the principle (rule, law, concept, skill, ideal, method, etc.) and give practice in transferring it to new situations:

Recognizing i-stem nouns in Latin.
Agreement of past participle in French.
Agreement of relative pronoun in English.
Inverted word order in German.
The meaning of "climax" in narrative or drama.
Distinction between the four types of composition.
The meaning of the term *æsthetic* as applied to literature.
The importance of outlines as an aid to study.
The importance of outlines as an aid in writing.
The laws of gravitation in physics.
The chemical properties of a salt.
The conditions necessary for the culture of bacteria.
The binomial theorem.
The laws of probability.
Historical justifications of the democratic form of government.
Direct *versus* alternating electrical currents.
Ideals of honesty, accuracy, or truthfulness.
Ideals of efficiency.

Section IV: Criticism of This Chapter

1. How clearly are the three procedures described in Section I applied in Section III? Point out the application of each procedure.

2. What have you learned from this study situation that is likely to transfer to your teaching situations? Specify the procedures in detail which you find useful.

Selected References

Parallel References for Group Study

S. S. Colvin — *The Learning Process* (1911).
Chapter XIV reviews investigations prior to date of publication and presents accepted conclusions.

J. H. Coursault — *Principles of Education* (1920).
Pages 330 ff. present an excellent criticism of formal discipline as an aim of education.

A. I. Gates — *Psychology for Students of Education* (1923).
Chapter XV presents data concerning the extent of transfer from different kinds of training and discusses the types of reactions which may transfer.

A. J. Inglis — *Principles of Secondary Education* (1918).
Chapter XI makes an important distinction between direct and indirect values of instruction and summarizes various analyses that have been made of indirect values.

C. H. Judd — *Psychology of High School Subjects* (1915).
Chapter XVII offers an explanation of transfer in terms of high-school instruction.

G. D. Strayer and N. Norsworthy — *How to Teach* (1916).
Chapter XII states the conditions which are understood to facilitate transfer.

Supplementary References for Individual Selection or Assignment

A. R. Mead — *Learning and Teaching* (1923).
Chapter VIII defines and discusses five factors in transfer with illustrations from typical studies of the problem. The references at the close of this chapter are noteworthy.

D. Starch — *Educational Psychology* (1920).
Chapters XIII and XIV contain an extensive survey of investigations.
E. L. Thorndike — *Educational Psychology* (1914).
Volume II, Chapter 12, presents original data and reaches conclusions reviewed by Inglis in the reference given above.

Additional References to Be Supplied by the Instructor

CHAPTER XV

THE PROCESS OF REFLECTIVE THINKING

As preliminary to a discussion of methods by which pupils are taught to think, the present discussion is intended to distinguish certain important factors in the thinking process. Only such of these factors need be distinguished as are common to most acts of judgment, reasoning, problem solving, and other forms of purposeful thought that are included in the term "reflective thinking."

Section I: Feeling a Difficulty

Success in teaching pupils to think for themselves depends, of course, upon how much *independent* thinking they do. The teacher can not think for them or even make them think, as he can make them form habits by frequent drill. The teacher can at best only *suggest* real problems, *supply* necessary data, and *check* results. Clear recognition of those factors in the thinking process which the teacher must leave to the pupil is, therefore, essential in the effective application of methods. The teacher must stimulate the pupil's reflection, and then *permit him to reflect.* The teacher's practical problem is thus to preserve a proper balance between guiding the pupil so little that he fails to recognize problems when he meets them and guiding him so much that he gets no practice in solving problems himself. *You are*

expected in this exercise to solve this problem as it applies to the teaching of one particular course; that is, you are to discover, if possible, certain respects in which your methods of teaching pupils to think may be improved by fuller knowledge of the thinking process.

Section II: Locating and Defining the Problem

Dewey proposes five logically distinct factors which are all to some extent implied in every act of reflective thinking:[1] (1) a felt difficulty; (2) its location and definition; (3) suggestions toward possible solutions; (4) development of these suggestions by reasoning; and (5) further experiment to test the usefulness of conclusions reached. While it is plain that these factors overlap to a considerable degree in any given thought process and also that their importance varies, these factors may serve as sufficient analysis of the thinking process for the purpose of this chapter.

Experiment. — Two puzzles[2] and four larger problems are given below which require reflective thinking. Read them all, and solve one that you find difficult in each group.

A. *Puzzles*

1. "Draw a diagram to represent the following situation as it is described. Let A and B indicate two switches about 500 yards apart on the single track of a railway, and B east of A. Both switches connect with a siding north of the main track at C. This siding is only long enough to hold one car and one locomotive. There are

[1] John Dewey, *How We Think* (1910), p. 72. Quoted by permission of the publishers, D. C. Heath and Co.

[2] Julius Boraas, *Teaching to Think* (1921), Chapter IX. Copyrighted by The Macmillan Co. Reprinted by permission.

three cars within reach that are numbered 1, 2, and 3. Car No. 1 stands on the main track between A and B; car No. 2 between B and C; and car No. 3 between A and C. A locomotive faces east on the main track at B. By the use of the switches and siding, turn the locomotive around so that it faces west and make up the train so that when it pulls out for the west at A the cars are attached in 1, 2, 3 order."

2. "Change one word into another word of the same number of letters by changing one letter at a time through an intervening series. Use only English words. For example — *black*, blank, blink, clink, chink, think, thine, whine, *white*. Change the word *cold* into the word *warm* by the fewest number of steps."

B. *Problems*

1. "When tumblers are taken from hot, soapy water, bottom side up, and immediately placed in the same position on a smooth surface, air bubbles will form on the outside of the rim. Then, after a short time, they will leave the outside and form on the inside of the rim."[1] Explain this fact as fully as you can.

2. Should most high-school pupils be required to study two years of some foreign language for the benefit of their general mental development and refinement? Write out your argument briefly, but supply evidence for all conclusions stated.

3. Measured results indicate that the ratio of the best to the poorest thinker in a class is usually 8 to 1 when the task assigned is to reproduce ideas gained from reading a paragraph. What does this imply with regard to

[1] J. Dewey, *op. cit.*, p. 70. Quoted by permission of the publishers, D. C. Heath and Co.

procedures in stimulating reflective thinking for the class as a whole? State certain implications specifically.

4. Should a teacher expect all high-school pupils to reason out all propositions in geometry or all translations in Latin? Define the problem exactly; then organize your discussion.

C. *Analysis*

1. After you have written out or discussed solutions to one item in both A and B above, check Dewey's analysis of the thinking process by listing after each solution (by number) such of these five factors as are clearly evident in your thinking.

2. State approximately in what proportion of the total number of class meetings in one high-school course for one month the pupils are confronted by situations which challenge their *independent* thinking to at least as great an extent as the above situations challenge yours.

3. Do you believe this proportion might be advantageously increased? Why?

4. *To what extent do you believe that these pupils have sufficient opportunity for and instruction in reflective thinking without having the thinking done for them? Reply in sufficient detail to make your answer convincing.*

Section III: Suggestions toward Possible Solutions

The teacher's function in teaching pupils to think is summarized and illustrated by Thorndike as follows:[1]

"So-called Reasoning is the result of ordinary habits of thought plus selection. Good teaching provides the basis for this selec-

[1] E. L. Thorndike, *Principles of Teaching* (1906), pp. 150–154. Quoted by permission of the author.

tive thinking, knowledge of the goal to reason toward and of the facts to reason with, arouses and guides it by the help of comparison, contrast, and analysis and forms the habit of always verifying the results. . . . There are by nature many more learners than thinkers. Teaching must not be blamed for not doing what only natural gifts can do.

"The teacher's work in guiding rational thought bears much the same relation to his work in habit formation that teaching a child to himself find the way to go from his house to one a mile away would bear to teaching him to follow the road there. In the latter case you have only to put certain acts with certain situations — going to the right by the mill, taking the path at the top of the ridge, and the like. But in the former you must make sure that the youngster knows what place he is to try to reach and keeps it in mind. He must also at least know that to get to a place you must keep going and not lie down to sleep; he must have some knowledge of the direction in which the house lies and of the roads and woods and valleys in the neighborhood. He starts off correctly and at a crossroad turns to the left. 'What did you do that for, John?' 'I don't know.' 'Where are you going?' 'To grandpa's.' 'Where does that road go?' 'To the school-house.' 'Is that on the road to grandpa's?' 'I don't know.' 'What comes after the schoolhouse if you go down this road?' 'The church.' 'How long does it take to go from grandpa's to the church?' 'Oh a long time.' 'Is grandpa's near the church?' 'No. It is a long way.' 'This road goes to the church. Is it a good way to go to grandpa's?'

"If your boy is bright enough, he now turns to the right, but soon comes to the end of the road. 'Where do I go now?' says he. 'Where do you think?' 'I think we go through that field.' 'Well, try it and see!' You rapidly approach a pond and the boy sits down and cries. 'I can't find the way to grandpa's.' 'What's the trouble?' 'You can't get around this pond, it's all swampy.' 'Do you have to go around it?' 'Yes. Grandpa's is up there and you have to go around the pond.' 'Go and look at the pond and see if you can find anything about it that will help you to get to grandpa's.' And so on with constant stimulation to the examination of each situation confronted and with the selec-

tion and rejection of ways in the light of knowledge of their consequences, until grandpa's house is reached, or until the problem in arithmetic is solved."

What does this quotation from Thorndike suggest with regard to improvements in your methods of teaching pupils to think? Are your methods radically different? *List tentatively those respects in which you think improvements might be made and explain each sufficiently to make it clear.*

Section IV: Development of These Suggestions by Reasoning

The teacher's activities in guiding the reflective thinking process are outlined by Parker[1] as follows:

"To stimulate and assist pupils in carrying on reflective thinking the teacher should

A. Get them to *define* the problem at issue and keep it clearly in mind.

B. Get them to *recall* as many related ideas as possible by encouraging them

1. To analyze the situation and

2. To formulate definite hypotheses and to recall general rules or principles that may apply.

C. Get them to *evaluate* carefully each suggestion by encouraging them

1. To maintain an attitude of unbiased, suspended judgment or conclusion,

2. To criticize each suggestion,

3. To be systematic in selecting and rejecting suggestions, and

4. To verify conclusions.

[1] S. C. Parker, *Methods of Teaching in High School* (1915), pp. 199 f. Quoted by permission of the publishers, Ginn and Company.

D. Get them to *organize* their material so as to aid in the process of thinking by encouraging them

1. To 'take stock' from time to time,

2. To use methods of tabulation and graphic expression, and

3. To express concisely the tentative conclusions reached from time to time during the inquiry."

In the light of this quotation from Parker revise your list of improvements in your procedures for teaching a particular class to think, as made in Section C above. Consider each item in the outline carefully in order to decide whether or not the suggestion is really valuable as applied to the work of your class.

Section V: Further Experiment to Test Usefulness of Conclusions Reached

The only valid test of the procedures you have proposed as directed in the above section is, of course, their effect on a particular class. It is expected that you will try out these procedures as conditions permit. For the present a more convenient, but less satisfactory test of these methods for stimulating pupils to think may be found in the criteria below. These indicate a few of the more frequent obstacles which prevent pupils from learning to think in high school.[1] You will note that many of these questions do not apply exclusively to the reflective thinking process. All do, however, emphasize difficulties which very largely condition the teacher's success in teaching pupils to think. *Read these questions over thoughtfully. Then in your reply to each state, first, to what extent you think it applies to one of the courses*

[1] Selected from the list discussed by J. Boraas, *op. cit.*, Chapter VIII.

you teach or observe, or may teach; and, second, what steps you have taken, or plan to take, to meet the particular difficulty, if it exists.

1. Has any particular pupil any sensory defect which may explain his difficulty in following the discussion or completing assignments? Imperfect vision, hearing, breathing, etc., is at times not recognized by the pupil nor discovered by parents even by the time a pupil reaches high school. Many teachers would naturally wonder why a pupil failed to respond correctly in a geometry class who could not see the figure clearly on the board, but who believes the other pupils have the same difficulty. Such unrecognized defects would probably only be found in pupils of superior mental abilities.

2. Can difficulties in comprehension be explained by certain pupils' lack of related experiences that you have taken for granted in your presentation of a given topic? For instance, a few pupils in high school have probably never visited a court, attended a business meeting, or heard parliamentary procedure described. They would probably fail to comprehend many of the simplest references to such matters.

3. Is the pupil's failure in logical thinking due to inadequate vocabulary?[1] We tend to think of language as primarily a means of communication. It is perhaps equally important as an instrument without which we can not *think* with any degree of exactness. High-school pupils are often unable to reach logical conclusions because their failure to understand precise terms prevents them from deriving precise meanings.

[1] See J. Dewey, *How We Think* (Heath), Chapter XIII.

This difficulty may be felt if you yourself try to distinguish clearly between the effects of *sarcasm* and the effects of *irony* upon a restless class.

4. Are the pupils' failures in logical thinking due to lack of training in analyzing the given material? Locating essential features in an unfamiliar subject is exceedingly difficult for anyone. In historical, literary, and language studies this difficulty is frequent and serious.

5. Are pupils encouraged to use mechanical devices (notes, figures, etc.) to prevent their aim from becoming vague? Unless the thinker knows exactly what he wishes to prove, it is, of course, impossible to select useful evidence. Read the often quoted illustration of complete aimlessness given by Adams in his *Exposition and Illustration in Teaching*, pp. 174 f.

6. Are pupils mentally capable of solving the problems you propose? Problem solving is perhaps the supreme test of general mentality. The fertility of mind required to form hypotheses and then abandon them in favor of more hopeful ones is decidedly uncommon.

7. Are pupils sufficiently critical of new ideas? The least-resistance habit of accepting well-expressed ideas at their face value is one of the most fatal to clear thinking and the most difficult to overcome.

Section VI: Analysis of This Chapter

The material in this chapter has been organized for the particular purpose of *demonstrating* the steps in the thinking process which have been discussed. Each of the italicized questions or directions, one of which appears toward the end of each section, is intended to

make you take the logical step which is indicated by the heading of the section in which it occurs. That is, as you read the last sentence of the first section you are expected to "feel a difficulty," as you reply to C 4 in Section II (p. 233) you are expected to "locate and define your problem," and so on for the remaining sections. This arrangement does not by any means imply that all reflective thinking follows this pattern, nor that there is any great merit in a hard and fast distinction between these factors. The distinction thus emphasized by the arrangement of material should, however, suggest to what extent these factors vary with respect to the amount of direct assistance the teacher can render. This variation may be further emphasized by the following questions:

Discussion:

1. To what extent did the underlined questions or directions in each section succeed in making you perform the mental step which appears in the heading of the section? Comment upon each section separately. After you have commented upon all five, rank the sections so as to show in which section your thinking received most assistance from the text, next most assistance, and so on.

2. Offer any suggestions you can toward making Sections III and IV more effective in your particular case, — *i.e.* by closer relation to your teaching subjects, by more or less explanation, and the like.

3. Which of these five steps may the teacher safely direct and which should be left for the pupil to take himself? Check them.

Section VII: Specific Application

Construct an exercise for use with some high-school class for the purpose of making the pupils conscious of the mental steps that are necessary in solving a problem and so helping them to think more systematically. Select some real problem that is not too difficult. Then write out these steps in language the pupils can understand, for example:

1. What are the things you have to do to solve the problem? Write them down.
2. What things must you find out before you can solve it? Write these down.
3. After you have solved it, how can you show that your solution is correct? How would you check it?

When conditions permit, it is interesting to experiment with such exercises and note the improvement in ability to solve problems which results from the pupils' having learned these rules of systematic thinking.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1923).
Chapter V reviews important theories of teaching pupils to think.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapter XIII defines the process of reflective thinking and illustrates high-school procedures used to stimulate it.

—— *The Learning Process* (1911).
Chapter XXII applies the psychology of two preceding chapters to classroom procedures.

A. I. Gates — *Psychology for Students of Education* (1923).
Chapter XIV distinguishes significant types of reasoning and presents a series of graded reasoning tests.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter IX outlines the learning and teaching processes which involve reflective thinking and the acquirement of abstract meanings.

G. D. Strayer — *A Brief Course in the Teaching Process* (1911).
Chapter V states the principles which should be followed in the attempt to stimulate reflective thinking.

Supplementary References for Individual Selection or Assignment

Columbia Associates in Philosophy — *Introduction to Reflective Thinking*, 1923.
The introductory chapter outlines the principles, tendencies, and variations in reflective thinking which the later chapters illustrate by reference to methods of research in various important fields. The second chapter discusses the technique of diagnosis. These two chapters present problems of reflective thinking in social terms and so provide an excellent perspective for the study of reflective thinking as a school activity. The rest of the book is equally valuable and stimulating.

A. R. Mead — *Learn ng and Teaching* (1923).
Chapter IV describes the elements in problem-solving activity in no matter what subject it occurs. The chapter references serve as a sufficient bibliography for further investigation of this topic.

W. C. Ruediger — *Vitalized Teaching* (1923).
Chapter I on "the problem of verbalism" suggests how the causes of verbalism in teaching may be discovered and removed.

E. L. Thorndike — *Principles of Teaching* (1906).
Chapters VIII–X analyze the procedures most useful in teaching pupils to think. The illustrative exercises are numerous and helpful.

Additional References to Be Supplied by the Instructor

CHAPTER XVI

TEACHING PUPILS TO THINK

Of the procedures discussed in this text, perhaps the most significant for high-school teachers in general are those concerned with teaching pupils to think. For this reason the present chapter is somewhat more detailed than the rest. Its primary purpose is to enable the teacher to think out procedures for classroom use which will increase the amount and value of his pupils' thinking.

Section I: Essential Procedures

For the purpose of this chapter we may accept Miller's definition of thinking as "the analysis of any problem in the light of the facts." The preceding discussion of the reflective thinking process should have made it apparent that in attempting to bring about this analysis of problems, the teacher is largely restricted to three main procedures, namely, (I) Creating the problematic situation, (II) Directing the pupils' search for data, and (III) Stimulating the pupils to criticize the conclusions they reach. The following problem may serve to emphasize the importance of these three procedures as means of stimulating your own thinking.[1]

[1] G. M. Whipple, *Problems in Educational Psychology* (1922), No. 60. Quoted by permission of the publishers, The Public School Publishing Co.

Procedures illustrated. *What advice should you have given the mother if you had been the principal in the situation described below?*

"Mrs. G. came to the principal of a certain high school to discuss the course of study of her daughter, Mary, who was about to enter the school. She complained that Mary did not concentrate her attention well, that she was not clear in her thinking. She said that she herself wanted Mary to take algebra, because she had been told by several of her friends that algebra was helpful in training the mind to think. Mary, however, was insisting that she did not want to take algebra, because she had been told that it was difficult and because she didn't intend to go to college later. Instead of algebra she wanted to take the course in household arts. Mrs. G. said she feared that the household arts course would not give Mary sufficient mental training of the sort she needed, and begged the principal to decide which course Mary should take."

A. Form a tentative reply to the question preceding the above problem; *i.e.* outline the advice you would give to the mother.

B. By what methods might an instructor enable *you* to think out a more adequate solution for this problem than that contained in your reply to the above question, without doing any of the thinking for you? Consider each of the specific procedures suggested below as though they were to be applied to you:

1. By actually sending a parent to consult you for advice upon a problem exactly similar to this one.

2. By offering a prize of $500 for the best solution proposed in an article of 1500 words by any teacher of your school.

3. By taking you through a course in formal logic

4. By asking you to observe the teachers of algebra and household arts to either of whom the pupil Mary will be assigned.

5. By introducing you to Mary so that you could get to know her intimately.

6. By arranging to have you sit in the office of an extremely capable principal while he advises pupils with regard to their choice of courses.

7. By teaching you more than you now know about the subject matter of algebra and household arts.

8. By teaching you more than you now know about the values of algebra and household arts for pupils like Mary.

9. By giving you a great many other problems of this same type and checking your results.

10. By arranging for Mary to take some work in each of these courses before she makes her final decision, so that you might change your advice if it proved unwise.

C. List by number such of these specific procedures as you think would *not* help you to think out a useful solution of the above problem.

D. Group the remaining procedures under that one of the three main procedures which you think it best represents; namely, (I) Creating the problematic situation, (II) Directing the pupils' search for data, or (III) Stimulating the pupils to criticize the conclusions reached.

Procedures outlined.— The remaining sections of this chapter present various specific procedures that are helpful in applying these three general procedures to a high-school class. For the sake of clearness these more

specific procedures may be outlined in advance as follows:

1. *Creating the problematic situation*, by

a. Adapting the aims of the course to the solution of life-problems proposed by the pupils after careful consideration; for example, vocational, social, or recreational activities related to the subject.

b. Introducing strictly college-preparatory courses as a challenge to the pupils' abilities to do college work.

c. Leading the pupils to formulate their own reasons for the study of each new division of the work and to state their objectives in terms of the larger problems which the course undertakes to solve.

d. Presenting daily assignments in relation to these stated objectives and developing unit problems in the class discussion which challenge the pupils' common sense because they are neither too easy nor too difficult.

2. *Directing the pupils' search*, by

a. Giving pupils complete freedom in their choice of references to consult, authorities to interview, experiments to make, etc., when working on problems of the type in which the experience of direct investigation is *more* valuable than the conclusions to which the investigation leads, as for example, in learning how to use the school library.

b. Allowing the class to participate in planning the study of a given topic or problem in which the process of thinking and the conclusions reached are of approximately *equal* importance.

c. Asking "thought questions" which help the class to appreciate the significance of the particular conclusions reached, assuming that the experience of thinking it out independently is of *less* importance to the class than the conclusion itself.

3. *Stimulating self-criticism,* by

a. Checking the correctness of conclusions reached by means of class discussion, consultation of authorities, actual experiments, and other evidence.

b. Conducting formal reasoning exercises to give practice in making correct inferences, as when the pupils are asked to check the good reasons for a certain statement from a list containing both good and bad reasons.

c. Marking pupils on their ability to follow a correct procedure in problem solving as well as on their ability to obtain correct results.[1]

d. Teaching, through example, and in other ways, the *ideal* of clear thinking.[2]

E. Check those procedures under each of the three headings of the foregoing outline which you think could be helpfully applied at the present time to some one high-school course. Then state specifically *how* you would apply these procedures.

Section II: Creating the Problematic Situation

The occasion for all thinking, whether in school or out, is a situation which challenges the individual's common sense. To create such situations is thus the

[1] See pp. 233–236 of the preceding chapter.
[2] *Ibid.*

teacher's first task. This task is the more difficult because the same assignment or problem which one class undertakes voluntarily, a different class, or the same class at a different time, may not find worth thinking about at all except as a means of meeting requirements. The particular type of situation is therefore less important in this connection than the attitude it arouses in the individuals concerned. In creating the problematic situation the teacher's point of departure is then the present attitude of the class toward the material to be learned. Having determined what this attitude is, the teacher presents certain new considerations which the pupil is inclined to accept as reasonable in themselves, but which he sees are in conflict with his present understanding of, and attitude toward, the topic under consideration. This present attitude is the pupil's personal property and he dislikes having its value questioned. "Is this attitude of mine wrong? Are the new considerations misleading? Or can both views be brought together by means of other facts that lie between the two positions? What are some of these things that I must find out?" When such questions as these arise in the mind of each pupil in the class, the problematic situation has been created for such use as the teacher can make of it.

Procedures depend upon scope of subject matter. — In taking up the procedures which are generally useful as means of creating these problematic situations, one should first consider those which apply to the course as a whole, then those which apply to progressively smaller teaching units. This means simply that a pupil is much more easily challenged by a single question in a class exercise if he is already curious about the outcome of

the general topic investigated and is already impressed by the importance of the course as a whole. The pupil, in other words, will usually discover problematic situations himself in a particular lesson if he has already become curious about a larger problem to which the lesson contributes. A teacher who reads these pages, for example, in order to improve his teaching, is more responsive to the minor problems implied than some other reader would be who had no reason for learning about general method to begin with except for a certain intellectual curiosity to discover what it is all about. We shall accordingly consider A, *Procedures affecting the course as a whole;* B, *Procedures affecting a large unit of the course; and* C, *Procedures affecting the single lesson.*

A. *During the first week the teacher should try to make each pupil regard the course as an opportunity to solve some problem which his common sense tells him is worth solving.* To accomplish this object the teacher would naturally specify some of the more important life activities related to the subject taught — particular vocations, particular social activities in which everyone engages, specific intellectual hobbies, and the like. He would then lead the pupils to consider to what extent their previous experiences and what they are likely to pick up out of school will qualify them to enter these vocations, to engage in these social activities successfully, and to cultivate these hobbies — respectively. He might then present samples of the material contained in the course and show its value in the life activities. The effect of such discussions might be checked by informal reports on "Personal benefits I may expect to receive from this course." Further discussion of these reports

in class is likely to show up those pupils who have advanced reasons that are not genuine and will often convince them that valid reasons are to be found. Such reasons as are thus suggested by the class should be summarized and referred to throughout the course whenever vagueness of aim becomes evident. In case the teacher himself finds it difficult to discover life activities to which the course contributes, there is probably no problem to which his own thinking could be more profitably directed. Such a series of reports on problems of vocational selection as Davis presents in his *Vocational and Moral Guidance* for use in English composition classes through the last six grades, suggests the possibilities of creating problematic situations in high-school subjects that are often purely formal.

B. *In courses required for college entrance and elected for no other reason, these aims are harder to establish; but the teacher has usually the advantage of a more responsive class.* For the teacher simply to state that the colleges require certain work to be done in a certain way, is by no means sufficient to create a problematic situation for the average pupil. It is often helpful, however, to point out particular abilities which are required to do college work in the given subject, and then to challenge the class to prove their possession of these abilities. When no such direct values of the course can be made convincing, such indirect values can be stressed as the appeal to intellectual curiosity, as in foreign language and mathematics, the social advantages of acquaintance with the subject, the opportunities for departmental club organization, and the like. Most classes in such "preparatory" courses can be led at the start to a real curiosity in "what

the course is about" and this attitude is sufficient basis for the development of problematic situations in terms of subject matter as the course proceeds.[1]

C. *In introducing a new unit of work to cover several class meetings the teacher should lead the pupils to state their own reasons for studying the topic and to state them in terms of definite problem objectives.* The following illustrations may suggest similar procedures in your own subjects: —[2]

"The Assignment. —

1. A consideration of the value of transportation to the home community.

2. The meaning of the words "transportation" and "communication" developed.

3. The statement of the problem.

4. How to begin to solve the problem made clear to the class.

"*A consideration of the value of transportation to the home community.* Ask the pupils to state the means of transportation in the community in which they live; also the ways in which this community is connected with the outside world. Do not go into detail upon this point. Simply call the attention of the class to the various means of transportation in the particular community. Now, ask some pupil to state the effect upon the community, if these various means were suddenly destroyed. This will help to impress the fact that any community is dependent upon its various systems of transportation for its existence and development.

[1] For suggestions consult the series of lesson plans found in S. S. Colvin, *Introduction to High School Teaching*, Appendix C.

[2] M. E. Simpson, *Supervised Study in History* (1920), pp. 224–225. Copyrighted by The Macmillan Company. Reprinted by permission.

"*The meaning of the words 'transportation' and 'communication.'* Dictionaries should be consulted and the meaning of each word carefully studied. This will bring out the point of transportation by land and by water (if this has not already been emphasized when considering the means of transportation in the community).

"*The statement of the problem.* By referring to conditions in the home community before the days of modern methods of transportation, and by questioning the pupils concerning the changes resulting from improved conditions, help them to realize that the development of transportation has had an influence upon the development of the home community. By allowing pupils who have lived in other centers to state the methods of transportation in those places, make it evident that the smaller communities form the nation. This will enable them to state such a problem as: — *How has the development of transportation and communication influenced the development of the nation?*"

D. *The teacher should challenge the pupil's thinking upon a single day's assignment by developing its relation to these larger units or by asking thought questions which in themselves challenge the pupils' common sense.* It is foolish to expect the pupils themselves to formulate *all* of the problems they are asked to solve. The teacher had often better present such minor problems ready-made, provided the class has been prepared to cope with them and appreciates their relation to the larger problems which the class has helped to formulate. Not all lessons, of course, require reflective thinking. In the case of those that do, the teacher can usually create the problematic situation by means of a ready-made problem if only

he requires the class to find it. For example, *which of the following methods of opening the class discussion do you prefer? State your reasons in the case of each subject illustrated.*

1. *a.* "Prove the following proposition: If two tri angles have two sides of one equal respectively to two sides of the other, but the included angle of the first is greater than the included angle of the second, the third side of the first is greater than the third side of the second." [1]

   b. "Two triangles have two sides of the one equal respectively to two sides of the other, but the included angle of the first is greater than the included angle of the second. What do you think will be true of the third side? Why?"

2. *a.* "Examine these three descriptive paragraphs. Which of them gives you the clearest mental picture? What is there about these paragraphs that explains this difference in clearness? Write a descriptive paragraph of your own that will make the reader see the picture as clearly as possible."

   b. "Each paragraph should be introduced by a topic sentence which is related in meaning to every other sentence in the paragraph. Write a paragraph in accordance with this rule."

3. *a.* "The vividness of the characters in Dickens' novels is chiefly due to the author's skill in identifying each character with some one physical or mental trait. List the characters in *A Tale of*

[1] See the development of this lesson reported by S. S. Colvin, *Introduction to High School Teaching*, pp. 421–426.

Two Cities and write opposite each the trait or expression by which the character is identified."

b. "Scott's *Ivanhoe* and Dickens' *A Tale of Two Cities* are historical novels of about the same length and there are approximately the same number of characters in each book. In which of these novels are the characters the more life-like? Which group do you think you could recognize more easily if the two groups were to walk into this room? Which group could you recognize more easily if you heard them talking together in the hall but couldn't see them? How does Dickens make his characters life-like? Compare the descriptions of a number of Dickens characters as each is introduced to the reader. Can you discover any rule which Dickens seems to follow in writing these descriptions?"

4. *a.* "From the standpoint of the political factors involved, which do you think might have been more easily avoided by wise statesmanship — the fall of Athens in 400 B.C. or the fall of Sparta in 371 B.C.? What specific reforms should you have tried to introduce in the domestic and foreign policies of either country at a period about twenty years before its downfall?"

   b. "Mention the more important causes for the downfall of both Athens and Sparta. Which of these causes were common to both states? Trace these common tendencies in both states from the year 500 B.C."

5. *a.* "What are some of the effects of decreasing the resistance to the flow of electricity? How do these

effects explain the importance of fuses in the wiring of a house?"

b. "A family had just secured an electric heater. The first night it was used, the fuse blew out. The boy said: 'Let's put a piece of copper wire across the fuse socket; then there can't be any more trouble.'

"The father said that they had better get a new fuse to replace the old one. The old fuse was marked 10A.

"Was the boy or was the father right? If the father was right, should they have got a fuse marked 6A, one marked 10A, or one marked 15A?" [1]

Problem. — Illustrate by a similar brief description the procedure you might employ to create a problematic situation in introducing the next assignment in some one high-school course.

Does the above direction to think out this procedure for your class create more or less of a problematic situation for you than any of the preceding five illustrations of high-school problems? Why?

Section III: Directing the Pupils' Search for Data

The psychological effect of the problematic situation should be an effort on the part of the class to understand or recall or collect such pertinent facts as are necessary in analyzing the situation. The direction of

[1] From C. W. Washburne's, *Common Science*, Copyrighted (1920) by World Book Company, Yonkers-on-Hudson, New York.

this effort is the teacher's second task. The more significant the problem, the more data the pupil must usually have before him before satisfactory conclusions can be drawn. Therefore the practical question is *How many data should the teacher supply?*

Should the pupils find their own material? — In popular discussions of project methods it is often urged that the pupils should "worry out" the data required to solve their problem. The value of such training is obvious enough. It teaches the class to discriminate between reliable and unreliable sources, between relevant and irrelevant details, between efficient and inefficient methods of investigation, between the two evils of being swamped with data and being short of data, and much else besides. But such strict interpretation of the project idea, in high school at least, involves the serious danger that the time and effort required to assemble the necessary facts may be out of all proportion to the value of the conclusions reached. The pupil who spends hours in his search for a fact which the teacher might have supplied off-hand, is more likely to develop indifference toward the whole undertaking than to develop any useful habit of research. How many of the data the teacher should supply must therefore depend upon the nature and scope of the problem. On this basis we may consider problems of three types, each of which suggests a procedure that is somewhat obvious:

Procedures for problems of various type. — A. *The first type of problem is that in which the actual experience in conducting a particular kind of investigation is* MORE *valuable to the class than the conclusions to which the*

investigation leads. The conclusion here is chiefly a means of motivating the process of thinking it out. In such cases the pupil should certainly collect the data himself. First-year classes, for example, are likely to profit more during their first few weeks in a new building by learning how to find material in the school library than they are by the material found. Where successful work in any subject demands the use of particular methods of finding data, practice in these methods is of first importance — as in natural science, social science, language studies, and others to a less extent. The procedures employed to teach such methods are entirely simple. The teacher first demonstrates the methods by investigating any typical problem himself. He then selects any problem which is well adapted to the use of the given method, challenges the class to solve the problem as rapidly or as accurately as possible, and sets the class to work on the problem without further direction. Suggestions are offered only when a pupil encounters a difficulty or when the results show that the method has not been clearly understood. The following report of a ninth-grade project suggests that the value of similar investigations depends upon the extent to which the class is thrown on its own resources, provided the method of procedure has once been carefully explained:

> "The inability to secure up-to-date material for study in vocation classes led to the pupils' taking the initiative in collecting this much needed material for the school library. Each pupil volunteered to obtain personal interviews from at least five prominent persons in the professions, trades, commercial lines, management, manufacturing, or farming, and to report these to the class for discussion. A series of questions was agreed upon by the

class. Committees were formed to take charge of each type of interview, as lawyers, physicians, etc., and to work over material collected and formulate one comprehensive report on its vocation. Each one became a member of the committee representing work he or she was most interested in. One member of each committee received contributions of pictures, magazine clippings, and references contributed by the class and arranged these in folders. The spirit of active coöperation was here very marked. Contributions were exchanged daily. At this point several classes doing the same work agreed to combine their respective reports for the final report for file and arranged for a general 'show day' for all. The chairmen of each class met weekly for this summary.

"The result was a folder filled with pictures, clippings of successful careers, references, and a well-rounded tabulation of a questionnaire on fifty different live lines of work that a girl or a boy might choose from, all properly labeled to be turned over to the school library. The prime value lay in the doing, and in the fact that it brought out local conditions, that the information was up-to-date and not an average struck from conditions all over the country." [1]

A further value of even greater importance would seem to consist in the actual practice of conducting such interviews.

B. *The second type of problem is that in which the process of thinking and the conclusions reached are of approximately* EQUAL *importance.* The method of procedure is chiefly important as a means of helping the pupil to understand and organize his material. The teacher should therefore prevent waste of time and unnecessary confusion by outlining the procedure for, if not with, the class; but the more the pupils take part in planning the method to be followed, the more likely they will be to think out similar methods of work inde-

[1] *Twentieth Yearbook, National Society for Study of Education* (1920), p. 166. Quoted by permission of the publishers, The Public School Publishing Co.

pendently. The following suggests an appropriate procedure in assigning problems of this second type:

"*The Assignment:*

1. The new work now to be considered is the Exploration of America by European nations. A few questions will aid the class to recognize the fact that the voyages made by Christopher Columbus were the means of creating a desire for further exploration and discovery.

2. A desire for further knowledge concerning the question of exploration may easily be obtained by reading brief extracts to the class. These should be selected because of their value in arousing interest. Accounts showing the high degree of civilization among the Incas of Peru, when conquered by Pizarro, or the Aztecs of Mexico, as related by Cortez, should furnish excellent material. Brief statements, picturing some of the conditions found in the New World by the early explorers from Europe, are better for this purpose than accounts telling why Europeans were eager to explore.

3. The pupils now will naturally be interested in finding out who explored the New World, and the reason for each exploration. It will then be a simple matter to state the problem for study, viz.:

"*The Problem:* Why did European nations wish to explore and colonize the New World?

The solution of this problem will require a series of lessons. This is frequently the case. It is not necessary to have a new problem for each lesson. Some problems may furnish the basis of study and research extending over a period of two weeks or even longer.

"*Study of the Assignment:*

I. 1. Using Montgomery's *Leading Facts of American History* as reference, find the countries of Europe most concerned in exploring the New World.

2. Under the name of each country, make a list of all the explorers you can find who rendered valuable services.

3. Write the date of exploration after the name of each explorer you have found.

4. After each name, list pages to show your source of information.

II. 5. Verify the work you have done by using Gordy's *History of the United States* as a reference. Make any additions necessary as a result of consulting the second reference. List all pages as directed in I. 4."[1]

C. *The third type of problem is that in which the process of thinking is* LESS *valuable than the conclusions reached.* In this case the teacher finds it important for the class to understand a single item in its relation to a larger whole. He therefore asks such questions as will help the pupil to think out these relations. While this procedure is almost universally followed in the teaching of all subjects, it is only the unusually skillful questioner who can really use it to improve the pupil's habits of thinking. The usual effect of this procedure is simply to emphasize certain considerations which the pupil might overlook except for the question form of statement. This familiar procedure is well described by Colvin in the following quotation:

"For example, if the pupil is being taught the nature of a river current, he should be asked such a question as this: 'If you were rowing in a boat upstream, would it be easier for you to keep in the middle of the stream or to row along its edges?' Or if he is being taught the meaning of high altitudes, he may be asked, 'Would it be as easy for you to run if you were on a lofty plateau as it would be on a similar level surface by the sea? Under which condition would you get out of breath sooner? If you were making a balloon ascension, would it be necessary to provide yourself with warm clothing?' Such questions as these bring to the pupil's mind the actual adjustments that he must make under such circumstances, and, therefore, give to the concept more than

[1] M. E. Simpson, *Supervised Study in History* (1920), pp. 84–85. Copyrighted by The Macmillan Company. Reprinted by permission.

a merely formal significance. While it is sometimes necessary and advisable not to attempt to develop such concepts to their ultimate conclusions, it must be remembered that finally such conclusions must be arrived at if the results of instruction are to be vital and significant."[1]

Discussion. — Select *one* of the following problems and outline the procedure you would recommend as a means of directing the pupils' search for the data necessary in solving it:

1. To prove the proposition stated in D, 1, p. 252, by means of theorems previously studied but before the textbook proof of this proposition has been examined by the class.

2. To determine the extent to which the presence or absence of topic sentences affects the clearness of paragraphs in any issue of the school publication.

3. To discover such differences in the environment and training of Scott and Dickens as may explain the difference in their methods of describing characters in their novels.

4. To find tendencies in the German Empire between 1870 and 1914 which are similar to tendencies that caused the downfall of Sparta and Athens.

5. To determine the relative degrees of resistance to an electrical current of 25 amperes found in platinum, lead, copper, steel, zinc, and silver filaments.

Problem. — Outline in some detail the procedure you would follow in directing the pupils' search for such data as they would need in order to develop the problem you have described as directed at the close of Section II, p. 254, of this chapter.

[1] S. S. Colvin, *The Learning Process* (1917), p. 324. Copyrighted by The Macmillan Company. Reprinted by permission.

Section IV: Stimulating Self-criticism in Problem Solving

Self-criticism is necessarily involved in the statement and tentative solution of any problem. No sensible person allows considerations to enter into his serious thinking which he knows are entirely irrelevant. In creating the problem and in directing the search for data the teacher inevitably stimulates self-criticism to some degree. We have here then merely to suggest certain procedures by which the pupils may be *trained* to check the soundness of their conclusions when made.

Procedures for training pupils to check conclusions:

A. The commonest procedure is the ordinary class discussion. Under normal circumstances class discussion is probably the most effective. The two main conditions for its effectiveness are that each pupil in the class understand exactly what the point of discussion is, and that the teacher be able to get most of the pupils into the game without permitting suggestions to be made at random. To develop habits of self-criticism it is supremely important that the majority of a pupil's answers shall be *right*. Lest previous emphasis of the need for *independence* in thinking should obscure the importance of correct results, the following statement by Thorndike is quoted at this point.

> "The fact that only a small fraction of a school class usually succeeds with tasks demanding initiative and self-direction seems to me to bear witness to their too great difficulty. Indeed, it seems to be tacitly assumed by many of those interested in encouraging self-reliance and aggressive thought, that not more than a quarter of the pupil's own shots will be hits. The common assumption is that in the active virtues it is the attempt rather than

its success that counts. Is it not often considered entirely permissible for three out of four children in the class to make preposterous suggestions so long as the answer comes from somewhere in the class rather than from the teacher? Yet there is no justification for teaching pupils to fail in original thinking any more than in routine. It is true that a pupil may well make a hundred failures as means to eventual success, if the failures are instructive, but our toleration of failure *outright* seems a sign of improper selection of the tasks."[1]

It is clearly important that the pupil stick at his problem until satisfactory results are reached if we expect him to acquire the habit of success. It is equally important that he receive such assistance during the process as may prevent him from becoming indifferent to the outcome.

B. A second procedure to motivate or supplement the class discussion is to be found in the so-called "best-answer" tests, which provide drill in the analysis of problems involved in the lesson studied. Such tests used systematically as class exercises are excellent devices by which to make the pupils critical of their own thinking. Exercises of this nature can readily be prepared by the teacher in connection with almost any lesson material and can be taken by the whole class at once in five minutes or less at the outset of the period. If the papers are then exchanged, the answers discussed, and then marked right or wrong by the pupils, this practice can be made exceedingly valuable. By recording the scores and encouraging each pupil to compete with his own best record, a wholesome spirit of competition can be used to emphasize and develop skill in

[1] E. L. Thorndike, "Education for Initiative and Originality" (1916), *Teachers College Bulletin*, Series 11, No. 4. Quoted by permission of the publishers, The Bureau of Publication, Teachers College, Columbia University.

the selection of best answers. The following example is taken at random from "Character Judgment Scale L" of the "Van Wagenen American History Scales": [1]

"8. The first newspaper published in New York City, the New York *Gazette*, was the organ of the governor and the aristocratic or court party. Nine years later, in 1734, the *Weekly Journal*, edited by Zenger, appeared and was from the start the organ of the popular party. At the time the governorship of the colony was being used to pension off any court favorite otherwise unprovided for, without reference to the result of his appointment upon the colony. Zenger began publishing a continuous succession of attacks on the Crown officials, the governing class, and finally upon the governor, Crosby, himself.

"Zenger was arrested and thrown into jail on the charge of libel. As the chief justice at the time belonged to the popular party, he was turned out of office and replaced by one of the stoutest upholders of the Crown. Even Zenger's lawyers were disbarred from the court so that he had to be defended by one imported from Philadelphia. The defense was that the statements asserted to be libelous were true. The attorney general for the Crown took the ground that if they were true, the libel was only so much greater. The judges instructed the jury that this was the law, but the jury acquitted Zenger. The acquittal was hailed with clamorous joy by the mass of the population, and gave an immense impetus to the growth of the spirit of independence.

"8a. Put a check mark in front of the three of the following motives which you think were the ones which most likely prompted Zenger to thus attack the governing class.

.... He may have wanted to achieve notoriety.

.... He may have wanted to expose what seemed to him a public wrong.

.... He may have wanted to take revenge upon the governing class for some wrong that he thought had been done to him.

.... He may have thought that his attacks would increase the subscription of his newspaper.

[1] Quoted by permission of the publishers, The Bureau of Publications, Teachers College, Columbia University.

....He may have wanted to bring about a better condition in public affairs.
....He may have wanted to stir up trouble just for the excitement of it.
....He may have wanted to be made a martyr of by the governing class.
....He may have felt that it was his duty to make the attacks.
....He may have thought that many of the governing class would themselves welcome such an exposure.
....He may have thought that the governing class would give him money to stop his attacks."

C. A third important procedure in teaching pupils the habit of self-criticism in their thinking is outlined by Carter in two articles on "Teaching a Study Habit."[1] The following extracts indicate the importance of giving pupils a clear consciousness of the methods they employ in working out conclusions to any problem and suggest how this consciousness can be systematically taught.

"*Teaching the habit of rewording questions.* As teachers have come to use a greater number of thought questions, they have found that pupils who really have the underlying information are not always able to formulate the answer at once. If the teacher has time, she may help the pupil to help himself. She may do this in many different ways. Probably the most common ways are to reword the question and to break it up into questions which the pupil may answer and which will serve as the basis for the answer to the original question. We will now assume that a teacher has decided to teach her pupils to form the habit of rewording or breaking up questions when the answer does not occur to the pupil after a moment's thought. . . .

"In calling the pupil's attention to the habit and indicating some of the advantages, the teacher might choose some time,

[1] R. E. Carter, *School Review*, XXIX, 695–706, 761–775. Quoted by permission of the publishers, The University of Chicago Press.

when she has just helped the whole class to get started in answering a question which they could not answer at first, to say, 'There are a great many times when you think you can not answer a question in class. If I have time and feel that you need encouragement and more confidence in yourselves, I help you so that you really make a pretty good recitation. But what are you going to do in the examinations when the rules of the game do not allow me to help you to get started? Many pupils, when they cannot start at once on an answer, are just 'quitters.' . . . Others know ways or have habits of getting started by themselves. If you had the same habits, you would get credit for satisfactory answers to many questions where you fail without these habits. Would you like to learn how to become self-starters? You wouldn't give much for an automobile these days without one. How do I help you to get started in recitations?' Several of the class may be able to tell some of the ways, though many of them would never have thought of them if the question had not been asked. While the idea is in their minds, further illustrations may be given to be sure they all know what is meant and to give them assurance that this habit will help them out of many tight places. During the next few days various plans should be used to remind them of the habit. When the next test papers are returned to the class for comment and discussion, the pupils can be reminded of the habit and asked to tell whether they used it. Some pupils who reworded questions may be asked to state the question in the language that helped them to get a start on the answer. Others may tell which questions they broke up and the simpler questions which they tried to answer first.

"A special form of the habit of breaking up questions is found in the solution of arithmetic problems and originals in geometry. It is the habit of asking, 'What will I have to determine before I can find the required answer?' . . . We will take a problem in arithmetic that involves getting partial answers as a preliminary step to the solution of the original problem.

"'A man gets an annual salary of $2200. He also receives annually interest from his savings amounting to $180. He pays an annual rent of $420. This is one-fifth of all his expenses for the year. How much does he save in a year?' Obviously, one

of the best 'starting' questions is 'what will you have to know before you can find out how much a man saves in a year?' Teachers very commonly and very properly insist on pupils repeating 'what is given in the problem' and 'what is to be found.' It is not quite so common, when these questions fail, for teachers to use questions to direct the pupils' attention to the intermediate steps, working backward from what is to be found. Without systematic training pupils are likely to begin to juggle figures for given conditions, without having any notion of what they will do with the resulting sum or product when they get it. It seems logical to start to think about what we *can* find from the given conditions. If a problem gives conditions *a*, *b*, *c*, and *d*, and says find *m*, there are a great many combinations in which the given factors may be used. But the pupil is not gaining proper habits of thinking and is not getting his answer in the most direct manner unless he starts to consider what he must know before he can get the required answer. If he sees what his intermediate partial answers must be, his problem is broken up and it will be easier to see how to use the given quantities in the solution of the problem."

Problem. — Select and work out in sufficient detail to apply them such procedures as you think might best stimulate the members of a particular high-school class to criticize their solutions of the problem you have developed in response to directions at the end of Sections II and III of this chapter, pp. 254 and 260.

Section V: Specific Application

1. Revise and rewrite your complete program for improving the thinking of some one high-school class as you have outlined it in response to the directions in Section I, E, p. 246. Apply in detail all such procedures discussed in this chapter as you find well suited to the particular class and subject.

2. When you have completed this program to your satisfaction, state by what procedures this chapter has helped your own methods of thinking most. Such help as you received should be apparent in the improvement of your final program (as worked out above) over the tentative program outlined in Section I, E, p. 246.

Selected References

Parallel References for Group Study

W. W. Charters — *Methods of Teaching* (1912).
Chapter XVI contrasts the lecture with the developmental method of instruction.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapter XIV compares the advantages of the so-called inductive and deductive lessons.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Chapter VIII describes fundamental procedures in teaching to think.

G. D. Strayer and N. Norsworthy — *How to Teach* (1916).
Chapter VII outlines procedures by means of which thinking may be stimulated.

Supplementary References for Individual Selection or Assignment

J. Boraas — *Teaching to Think* (1921) entire.
The book distinguishes various types of classroom thinking and describes appropriate teaching procedures in some detail. Complete and well-organized bibliography.

J. Dewey — *How We Think* (1910).
Note especially Chapters III, V, XII, and XV. A valuable general reference. The teaching procedures which best stimulate the learning activities described are clearly indicated.

H. L. Miller — *Directing Study* (1922).
Chapter I illustrates a number of suggestive procedures for teaching pupils to think.

F. W. Thomas — *Training for Effective Study* (1923).
Chapter III discusses the motivation of independent thinking.

E. L. Thorndike — "Education for Initiative and Originality," *Teachers College Record*, Vol. 17, 405–416 (1916).
Attacks the notion that routine is unnecessary for the development of initiative and offers much practical advice.

Additional References to Be Supplied by the Instructor

CHAPTER XVII

THE DRILL LESSON

It is unnecessary to stress the importance of drill or practice in all teaching. Everyone knows that much of our learning consists in the formation of habits and that habits are formed by practice. Practice makes perfect. But not everyone knows that practice of the wrong kind is often worse than no practice at all and that practice can only make perfect when it meets certain psychological requirements.

The requirements as outlined previously[1] may be reduced to three:

1. *Motivation,* which shows the pupil his need for the drill and directs his full attention to it.

2. *Practice exercises,* which break up the skill to be acquired into its different elements and require these elements to be mastered one at a time.

3. *Testing,* which requires the pupil to apply the skill in the way it is intended to be used so that he may appreciate the value of his practice and so that the teacher may discover in what elements some pupils must have more practice before standard proficiency is reached.

This chapter affords some practice in planning drill lessons to meet these requirements. Each requirement is discussed separately in the following sections.

[1] See p. 192.

Section I: Motivation

A drill lesson is sufficiently motivated when the class as a whole voluntarily gives full attention to the practice for the purpose of learning the skill to which it leads. In attempting to meet this major requirement of motivation the teacher should distinguish the following *minor* requirements which it includes:

A. *The teacher should make the class appreciate the need for a given skill by setting a worthwhile problem that can not be solved until the skill is acquired; for example, Latin sentences which can not be translated until a particular construction has become familiar.* (*See illustration in* A *below.*)

B. *Whenever necessary the teacher should show by a model or other clear illustration exactly what the skill is that the class is expected to acquire; for example, the demonstration of methods by which to solve certain problems in mathematics.* (*See examples in* B *below.*)

C. *The teacher should secure full attention to drill exercises by making them brief, varied in character, and as agreeable as possible; for example, see illustrations in Section II below.*

Exercises which illustrate how the above requirements can be met:

A. *Demonstrating the need of the skill to be learned.* Recall one drill lesson which you have taught or one which you have observed. Then try to answer the following questions regarding it:

1. Was the work of the period directed toward the acquirements of one definite type of skill?

2. Were most of the pupils convinced that they needed to acquire the skill?

3. Did the lesson consist of definite exercises which required the class to practice upon one element of this skill at a time?

4. Were these elements learned in order of increasing difficulty?

5. What sort of standard was used to determine when each pupil had received sufficient practice?

6. Did the drill exercise require the pupils to practice these skills in the way they were to be used when learned?

7. Were the pupils tested by being required to apply the skill in *new* situations?

Discussion. — On the basis of your replies to the above questions, to what extent do you feel the need of more information concerning the requirements of drill lessons or the need of more practice in conducting them?

Problem. — Devise a procedure by which you might lead some one high-school class to feel the need of practice upon some one important element of the work.

B. *Demonstrating the nature and amount of the skill to be learned.*

Various models or illustrations, which might be used to demonstrate the particular skill which a class is expected to acquire, are described below. Select the two you consider most satisfactory and give your reasons for selecting them.

1. A teacher of typewriting distributes copy and tells the class to practice until the copy can be correctly typed at the rate of so many words per minute.

2. A teacher of French or Latin in conducting drill upon irregular verbs requires the class to practice until it can give the correct synopsis, in the first person singular of each tense, mood, and voice, of any one verb studied, within one minute.

3. A teacher of history in conducting drill upon the facts of the English industrial revolution requires the class to study the text until the gist of each paragraph in the text can be correctly written from memory.

4. A teacher of general science requires the class to practice the construction of mercury tube barometers until their readings correspond to those of the barometer in the laboratory.

5. A teacher of English composition requires the class to study the rules of punctuation and work on exercises in punctuation until errors in punctuation in class themes are reduced to one for each 300 words.

Problem. — Describe *three* such illustrations or models which you might use to motivate drill work upon some one skill in a particular high-school class. In addition to showing the pupil what is expected of him, such standards should also increase interest by providing competition between groups, and self-competition to beat one's own record.

Section II: Practice Exercises

The value of carefully graded exercise materials in the learning of skills or habits should be apparent to any teacher. Such exercises may be used from year to year to teach mastery of the fundamental skills upon which satisfactory progress in any course depends. Excellent illustrations of this type of exercise are the

Courtis *Practice Exercises in Arithmetic.* By means of such materials the teacher can discover in which of the various operations involved in the process of addition, for example, various pupils most need practice, and can then set each group to work on appropriate exercises to correct their deficiencies. Such exercises are essential in any course which involves learning particular habits of work, rules of procedure, and the like. Consequently any high-school teacher who is unable to secure published exercises of this type in textbook or syllabus form for the courses he teaches should prepare his own. This means, of course, that original exercises must be prepared for all elements of the work except, perhaps, for the most obvious elements in subjects that are largely standardized, such as English grammar, foreign language, and mathematics. In the preparation of practice exercises the suggestions below are helpful:

Suggestions for the preparation of practice exercises:

A. *The teacher should analyze the requirements which a pupil must meet to pass the course until each of these course requirements is reduced to its simplest elements. For example, one such requirement of a course in English composition might be the ability to punctuate one's own writings with no more than one mistake per 50 words. This general requirement might be analyzed into the specific skills required to use each of the various punctuation marks correctly.*

B. *In constructing exercises the teacher should take up each of these practice elements separately. The exercise should consist of a series of short problems in which no unfamiliar elements enter except the single element which the exercise is intended to teach. For example, a punctua-*

tion exercise used to teach the use of the comma to separate clauses in a complex sentence should consist entirely of complex sentences which require no other punctuation than this particular use of the comma.

C. *Drill exercises should develop habits in the way they are used. For example, the pupil should learn to spell unfamiliar words in context rather than separately.*

Exercises which illustrate how the above requirements can be met:

A. *Demonstrating the analysis of a course requirement into practice elements.*

1. List as many *distinct* requirements as you can which a pupil must meet in order to pass some one high-school course.

ILLUSTRATIONS:

SUBJECT	COURSE REQUIREMENT
English composition	Choice of words, spelling, punctuation, sentence structure, paragraphing, etc.
Algebra	Accuracy and speed in various fundamental operations, ability to select the operations necessary in solving problems, etc.
Chemistry	Understanding of basic principles, memory of formulas, combination of the two in problem solving, laboratory skills, etc.
History	Understanding of historical tendencies, memory of significant facts, ability to interpret current events in terms of historical tendencies, etc.

2. Select one of these course requirements in one of your teaching subjects and analyze it into its practice elements.

ILLUSTRATIONS:

SUBJECT	REQUIREMENT	PRACTICE ELEMENTS
English composition	Choice of words	Vocabulary building, synonyms and antonyms, use of dictionary, etc.

Algebra	Accuracy and speed in factoring.	Ability to factor expressions of each of the seven cases commonly distinguished.
Chemistry	Understanding principle of atomic weights.	Ability to determine atomic weights of various elements.
History	Understanding significant tendencies underlying World War.	Ability to relate important events in World War to historical tendencies, etc.

B. *Demonstrating the construction of practice exercises.* *Select one such element in one high-school course you teach or can observe on which the class most needs practice at the present time. Work out exercises which you might use to provide this practice in a number of ten-minute periods. Before constructing your own, examine the following exercises which apply to the practice elements listed above.*

ILLUSTRATIONS: *English composition;* an exercise in vocabulary building.[1]

"The teacher writes on the blackboard a sentence containing one new word. The pupils infer its meaning from the context, one pupil verifying with the dictionary. Several pupils use the word orally in original sentences. Others work at the blackboard. The word alone is then listed on the board and its spelling emphasized. Its derivation may be explained by the teacher if the derivation is of interest or helpful in establishing the meaning. Care should be taken to select words which, though new to the pupils, are of usual occurrence in daily speech. The following sentences constitute the basis of a ten-minute exercise for an Eighth B Grade:

He is under *obligation* to complete his work.

We offer a *reliable* guarantee.

The box is *slightly* larger than the dimensions given.

[1] L. M. McGregor, *Supervised Study in English* (1921), pp. 168 f. Copyrighted by The Macmillan Company. Reprinted by permission.

One pupil should be appointed to keep in a class vocabulary book a list of all words used in such exercises so that the words may be reviewed from time to time."

Algebra: an exercise in factoring quadratic trinomials, Case VI.[1]

Factor the following expressions:

$$x^2 + 7x + 12$$
$$a^2 - 2a - 8$$
$$x^2 - x - 56$$
$$6x^2 - 23xy + 21y^2, \text{ etc.}$$

Chemistry: an exercise in determining molecular weights:[2]

Determine the molecular weights of the following substances:

Nitrous oxide	290 c. c. weighs 0.574 g.
Hydriodic acid	93 c. c. weighs 0.531 g.
Ether (gaseous conditions)	230 c. c. weighs 0.766 g.

of the following gases:

Ammonia	Sp. G. (air) 0.597
Carbon Monoxide	Sp. G. (air) 0.968
Cyanogen	Sp. G. (air) 1.806

History: an exercise in how-to-study.

Topic: To what extent were the important political events in European nations during the war due to economic causes rather than to military causes?

The teacher selects one such important political event, the formation of the Lloyd George coalition cabinet in England, for example, and directs the class to references containing the facts. In discussing these facts in class, the pupils are required to cite authority, to show the bearing of each fact upon the question proposed, to restate the question if necessary in order to dis-

[1] Refer to G. E. Atwood, *Exercises in Algebra*, pp. 69 f., for further illustrations.

[2] Brownlee, Fuller, Hancock, Sohon, Whitsit, *First Principles of Chemistry*, p. 101. Quoted by permission of the publishers, Allyn & Bacon.

tinguish economic and military factors more clearly, and to examine their methods of securing helpful evidence from the books consulted.

C. *Demonstrating the relation between the practice exercise and later use of the skill.*

Revise the exercises you have prepared to make sure that they require the pupils to practice the skill in the way you expect them to use it after it has been acquired.

Section III: Testing

Testing is an essential factor in all drill work for two reasons. First, it enables the pupil to discover how much the practice helps him in meeting the requirements of the course; and second, it enables the teacher to discover whether a sufficient amount of practice has been given. These purposes should be accomplished if the suggestions below are followed:

1. The test must cover all the elements that have been practiced separately in order to show the pupil how well he can meet the single broad requirement of the course which involves these elements, and in order to show the teacher in which elements various pupils may need more practice.

2. Pupils thus shown to need more practice on the same element should be grouped together, each group being set to work on exercises suited to its needs until satisfactory skill has been attained.

Exercises which illustrate how the above requirements can be met:

A. *Demonstrating the test of practice results.*

Prepare a brief test to cover the elements into which you have analyzed one requirement of your course; as

in your reply to A, 2, p. 274. The following illustrations should help.

ILLUSTRATIONS: *English Composition;* a test of skill in choice of words.

Such a test is, of course, provided in all the original writing the pupils do; but the test which represents the various types of exercises on which the class has practiced is more likely to help the teacher in locating difficulties. Skill in choice of words might therefore be tested by requiring the class to use the new words studied in sentences, to improve sentences containing faulty use of words both with the dictionary and without, to supply synonyms for selected words, and to select from a list of synonyms the one word which best fits a certain context, as in filling the blanks of defective sentences.

Algebra: a test of speed and accuracy in factoring expressions of all cases:

Factor the following expressions:

$x^3y^2 - 9z^6$

$a^3b^3c^3 - 3ab^4c^2 - a^2b^3c^2$

$20x^3 + 25x^4 + 4x^2$

$8 + b^6$

$x^5 - 243$

$4a^4 - 13a^2 + 1$

$7x^2 - x - 6$

Chemistry: a test of understanding of principles involved in the measurement of atomic and molecular weights.

Solve the following problems:

What does Avogadro's hypothesis imply as to the ratio of the vapor densities of gases to their molecular weights?

On what other hypothesis can molecular weight be determined?

0.58 gram of acetylene gas has a volume of 495.7 c.c., standard conditions. What is the vapor density of acetylene? What is its molecular weight?

Compute the molecular weight of nitrogen from the following data: 222.5 c.c. of nitrogen at 27° C. and 760 mm. pressure weighs 0.25 gram.

History: a test of ability to interpret the social significance of historical events: — World War:

The teacher might select from such a diary of the war as is found in the *Daily Mail Year Book* about ten significant events which the class had studied in their relation to various belligerent countries. The class might then be required to list these events in order of their *economic importance* to each of the countries affected. Reasons should be called for whenever the order of events is open to question.

B. *Demonstrating "follow-up" work in individual deficiencies.*

It is obviously impracticable to bring all pupils to standard proficiency in all elements without sacrificing other types of instruction that are more important than drill. It is, however, quite possible so to assign drill work that pupils receive practice upon elements in which they are weakest, thereby avoiding the waste of time that occurs when the whole class is held up on account of a minority of pupils who need more drill upon some one phase of the work. By means of the study-recitation or laboratory procedure,[1] it should be possible to set each group of pupils who are weak in the same element of the work an exercise on which each group may practice at the same time. Such differentiated group drills are usually most effective after the various elements have been taken up in class and after a test has been given to discover the individual deficiencies which demand continued practice.

[1] See Chapter VIII.

Experiment, if possible, with one of the classes you teach by using this method of following up your testing. After a certain amount of practice on your part the efficiency of this means of organizing drill work should be apparent.

Section IV: Specific Application

Problems:

1. Apply the excellent observation outline found in Burton's *The Supervision and Improvement of Teaching*, pp. 170–173, to a drill lesson in some one high-school class. List by number and letter the questions contained in the outline to which you can not reply favorably.

2. The foregoing discussion should have sufficiently emphasized the fact that mere repetition does not lead to mastery. Mechanical performance of a drill exercise is of small value. Drill work to be efficient must receive full attention. Hence three essential qualities of the high-school drill exercise are that it shall be brief, varied in character, and as frequent as necessary to secure mastery. The ten-minute drill exercise distributed over sufficiently long intervals is probably the best suited to most high-school subjects.

The following typical exercise is one of this kind. Criticize it on the basis of requirements discussed in this chapter. Which of these requirements are not provided for? Should they have been?

"*Who, Whom.* Sentences like the following are written on the blackboard.

1. —— is it?
2. —— do you mean?
3. —— did you send?
4. —— do you think it is?
5. —— shall you ask to see?

6. To —— did you write?
7. —— did you see?
8. —— do you think you will see?
9. —— do you think will be elected?
10. —— was elected?
11. —— did they elect?
12. I do not know —— you mean.
13. I do not know —— it is.
14. I do not know —— he sent.
15. I do not know —— has been elected.

"The class is told that blanks are to be filled with *who* or *whom*. One pupil is allowed to read until he makes a mistake. Any pupil detecting an error stands. From those standing a pupil is chosen to continue the reading. When the sentences become so familiar by repetition that no mistakes are made, pupils may time themselves in reading the entire list." [1]

3. Which of the three major requirements that are stated in the first paragraph of this chapter do you find most difficult to meet? Which of the minor requirements discussed in the section devoted to this major requirement do you consider most important? Outline specific procedures which you might use with a given class in meeting this minor requirement and try these out until you obtain satisfactory results.

Section V: Criticism of This Chapter

Does this chapter as a whole demonstrate good drill procedure? Criticize its organization by listing such sections or parts of sections as do not meet the various requirements outlined, and comment briefly upon each item listed.

[1] L. M. McGregor, *Supervised Study in English* (1921), pp. 167–168. Copyrighted by The Macmillan Company. Reprinted by permission.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).
Chapter VII states the principles underlying the drill process and discusses them briefly.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Chapters IX and X outline the importance and scope of practice in all learning and describe economical methods of drill.

L. B. Earhart — *Types of Teaching* (1915).
Chapter XII applies the principles of habit formation to the construction of drill exercises.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter VII also relates the psychology of practice to the technique of drill lessons.

S. H. Rowe — *Habit Formation and the Science of Teaching* (1909).
Chapter IX (especially pp. 175–176) discusses methods of securing practice economically.

G. D. Strayer — *A Brief Course in the Teaching Process* (1911).
Chapter IV reviews factors in drill from a slightly different angle.

Wilson, Kyte, and Lull — *Modern Methods in Teaching* (1924).
Chapter X applies the laws of learning to drill procedure and discusses each application by illustrations from elementary school practice.

Supplementary References for Individual Selection or Assignment

A. I. Gates — *Psychology for Students of Education* (1923).
Chapters X and XII and especially Chapter XII on "Principles of Economy in Learning" supply the psychological data necessary for a more complete understanding of the drill process.

T. J. Kirby — *Practice in the Case of School Children* (1913).
The monograph discusses the effect of various types of drill procedures.

A. R. Mead — *Learning and Teaching* (1923).
Chapter III presents significant facts concerning associative learning and habit formation. A sufficiently extensive bibliography for further study is found on pp. 28 f.

E. L. Thorndike — *Principles of Teaching* (1906).
Chapters IV and VIII deal with the activities of apperception and associative learning in their relation to drill teaching.

Additional References to Be Supplied by the Instructor

CHAPTER XVIII

THE INFORMAL TEST[1]

Purpose of this discussion. — "The three main dimensions of a pupil's ability are (1) how much or how difficult, (2) how well or how accurately or with what quality, and (3) how rapidly." Scientific testing attempts to measure each of these dimensions by a scale which is valid for all pupils who possess any of the ability in question. Informal classroom testing is far simpler in that it usually undertakes to measure only the second of these dimensions by a scale which need only be valid for a given class. Such testing may be called reasonably efficient (1) if it serves to indicate the relative position of each pupil with regard to the teacher's objectives, (2) if it economizes time and effort for teacher and class, and (3) if it acts as an incentive to future learning. This chapter is intended to suggest certain forms of test which meet these conditions and to stress the importance of employing these different forms in order to test as many significant effects of instruction as possible.

Section I: What Should Be Tested

The items listed below represent different effects of your teaching upon the pupils you teach or expect to

[1] This chapter should not be undertaken until a somewhat careful study has been made of Chapter VIII in S. S. Colvin's *Introduction to High School Teaching*. In case this reference can not be studied previously, follow the directions in Section I, then discuss the questions in Section II, then work out Section III for later discussions.

teach. Each of these items may be tested to some extent. Place numerals beside each of these items in the left margin to indicate your judgment regarding their relative importance to a particular high-school class; that is, place 1 beside the effect you consider most important, 2 beside the next most important, and so on:

A. The pupils' ability to understand readings and class discussion.

B. The pupils' ability to remember significant details.

C. The pupils' ability to remember the main points in outline.

D. The pupils' ability to select from the material studied and apply it to problems given in class.

E. The pupils' interest in those parts of the work which the teacher considers important.

F. The pupils' ability to adapt and apply the material studied in class to similar situations in real life out of class.

The following questions under the corresponding letters are intended to show how each of these "effects" might be tested in this class. You are asked to note the form of each question carefully in order that you may later be able to employ these forms in tests which you construct for your own use.

Section II: Illustrating Various Types of Informal Test

Prepare answers to each of the following questions as directed below, on the basis of the reference to Colvin assigned in the footnote on the opposite page.

A. *Testing ability to understand readings and class discussions.*

On the basis of Colvin's discussion answer each of the

following questions by "yes" or "no." Then in the space below each statement give one good reason for your belief.

1. Is it more economical to test each specific effect of teaching separately, even though these effects must be cumulative in any well-organized course?

Reason:.....

.....

2. When review work and testing is concentrated in a single lesson at the end of the term, does it yield much better results than when scattered over several lessons?

Reason:.....

.....

3. Except when determined by standardized tests or other purely objective methods, does the assigning of marks to pupils do more harm than good?

Reason:.....

.....

4. In spite of the fact that pupils can not profit so readily by others' mistakes and that it requires more time to mark, is the written test more efficient than the oral test in revealing weaknesses and in saving time?

Reason:.....

.....

B. *Testing ability to remember significant details.*
Supply from one to three words to fill the blanks in the following quotations so as to make the statements true:

1. "Appreciation ..... mere personal whim; it ..... left entirely to chance and individual preference."

2. "Certain subjects in the high-school curriculum require .....examinations from the fact that in these subjects the knowledge and skill are cumulative."

3. "A well-organized review lesson should .... the more essential points and .... exceptions and minor details."

4. "Reviews should ..... those details of subject matter in which the pupils are known to be ....."

C. *Testing ability to remember the main points in outline.*
Colvin's chapter on "The Test for Knowledge" may be roughly outlined by three main topics. State these topics in your own words:

1. ....

2. .....

3. .....

State as many as you can of the four "important considerations" regarding the test for knowledge as defined by Colvin:

1. .....

2. .....

3. .....

4. .....

D. *Testing ability to select from the material studied and apply it to problems in class.*[1]

While substituting for another teacher in your subject, you take occasion to give a test. In reading the papers you discover four cases of rather flagrant dishonesty. The offenders are not at all contrite when called to account and say that such cheating is general. Select from the contents of Colvin's chapter and your general experience, of course, such data as will indicate:

1. As many *causes* for this situation as may be traced to the kind of tests these pupils were usually given; and

2. As many *remedies* for the situation as might be found in the improvement of testing methods.

List these causes and remedies as briefly as you can without comment.

E. *Testing interest in those parts of the work which the teacher considers important.*

The chapter on which this test is based contains various types of material as listed below. Check the type you find most interesting; that is, check one type

[1] In certain subjects, notably English literature, history, and science, this "effect" can well be tested by the multiple-choice test, of which an example appears on pp. 263 f.

of material which you wish had been supplied at greater length, either on account of its importance to you or on account of the pleasure you found in reading it. List the others in order of decreasing interest if you care to.

1. Reasons for the use of various methods; *e.g.* "The test for knowledge holds the pupil down to his tasks."

2. Accounts of successful experiments; *e.g.* the account of the algebra and English teachers who recorded mistakes made by individual pupils.

3. Information regarding the use of objective marking devices.

4. Practical suggestions for the improvement of testing, *e.g.* "The test for knowledge, as a rule, should be given as a class exercise."

5. Descriptions of class work which reveal the faults of common practice, *e.g.* the poor economy of individual work at the board, the mechanical Latin recitation, etc.

F. *Testing ability to adapt and apply the material studied in class to similar situations in real life out of class.*

Apply the recommendations of Colvin's chapter and those of this chapter to the testing of some one high-school class as follows:

1. Write a brief test upon one important element in work the class is doing at present.

2. State briefly some of the ways in which the results of your test may be used in later teaching.

3. Mention any shortcomings in your former methods of testing as measured by Colvin's standards.

Section III: Importance *vs.* Difficulty

Criticize the above tests in terms of their effects upon you by replies to the following questions:

A. Number the questions one to six so as to indicate the relative *importance* of their answers to you. Assign six points to the most important, five points to the next most important, etc.

A.....B.....C.....D.....E.....F.....

.....

(number on this line)

B. In the same way number the questions to indicate their relative *difficulty*. Assign six points to the question you found most difficult to answer satisfactorily, etc.

A.....B.....C.....D.....E.....F.....

.....

(number on this line)

C. Compare the "importance" values with the "difficulty" values assigned to each of these questions. Do the most important questions tend to be the most difficult or the least difficult for you? Or is there no apparent connection between importance and difficulty?

D. What, if anything, does your experience with these questions suggest as to the wisdom of marking pupils on the basis of difficulty alone?

E. How may the two standards of importance and difficulty best be combined in marking tests?

An interesting experiment which serves a useful purpose is to determine the *relative difficulty* of the various questions in a test you have actually given to a high-school class by the following procedure:

1. If the pupil's answer is more nearly right than wrong, mark it right; if more nearly wrong, mark it wrong. Add the number of right answers to each question. Then add the right answers to all questions.

2. Find what per cent the number of correct replies to each of the questions is of the total number of correct replies.

3. Subtract each of these per cents from 100, divide the result by the number of the questions less one, and assign the result to each question as the percentile value of that question. These percentile values will indicate the approximate difficulty of each question as determined by the class response. *For example:*

Number of Questions	Number Correct	Per Cent of Total Number Correct	Subtract from 100 Divide by 3	Percentile Value
1	20	46.5	19	19
2	10	23.4	25	25
3	8	18.6	27	27
4	5	11.5	29	29
	43	100.0	100	100

While of course their judgments are by no means trustworthy, it is often interesting to ask the members of a class to arrange the questions in a test they have just taken in what each considers to be the order of *relative importance.* When the returns have been summarized, they frequently indicate a belief in the value

of certain items of subject matter to which the teacher himself had supposed the class entirely indifferent.

Section IV: Conclusions regarding Test Procedure

Without attempting to foretell the issue of present controversies over the old *versus* the new *versus* the standardized types of test in high-school subjects, it is possible to reach somewhat definite conclusions with regard to the types of test most useful at the present time and for some years to come. The standardized test presents no problem because of the few subjects in which these tests have been developed to the point of real usefulness for teaching purposes. The few standardized tests which exist to measure the attainment of recognized objectives in any high-school subject have so few forms available that they can not be used more than once or twice with the same group of pupils. The choice, therefore, lies largely between the *old* and the *new* types of test.

It is, perhaps, unfortunate for high-school practice that the recent popularity of educational measurement has produced so much formulation of the principles of standardized testing and so little formulation of the principles of informal testing, since the high-school teacher must always depend chiefly on the latter to determine how far the particular needs of a given class of pupils have been provided for. There are indications that this field of non-standardized or informal testing will receive the much needed attention of experts and enjoy a rapid development within the near future. At present, Professor Monroe's recent study of the written

examination in the high school[1] is one of the few authoritative treatments of the subject. The conclusions reached in this study are of such practical importance that, by the author's permission, they are here somewhat extensively quoted to constitute the basic material of the present chapter.

"Advantages of the 'new examination.'—Examinations consisting of exercises of the types described above have certain obvious advantages. There will be a large saving of time for both teacher and pupil. The pupil is called upon to do little or no writing in giving his answers and therefore is able to respond to a large number of exercises. The teacher in scoring will have little or no occasion to use judgment as he will need only to note the brief responses given by the pupils. Thus the labor of scoring will be greatly reduced and, more important, the scoring will be much more highly objective than that in the marking of examination papers of the usual type. The saving of time in the giving and scoring of the 'new examination' will more than offset any additional time that may be expended in its construction. Another advantage is that the new examination can be made more comprehensive. Examinations as a rule consist of ten questions. Some are limited to a smaller number. Consequently the scope of examinations of the traditional type is necessarily narrow. 'New examinations' of the true-false type should consist of not less than fifty exercises and may have as many as one hundred. Other types of the 'new examination' should be of a corresponding length. Hence a 'new examination'

[1] See annotated reference in the Selected References at the close of this chapter. Pages 60–65 are quoted in this section by permission of the author.

will usually be more comprehensive than a traditional examination.

"Limitations of the 'new examination.' There are certain limitations of the new examination which should be noted along with its advantages. It can not be used in mathematics except to a limited extent. It can not be used at all in English Composition. In other subjects there are many phases of achievement which are not measured directly by examinations made up of exercises of the types described above. Hence, although the 'new examination' is more comprehensive with reference to information, and does measure certain types of achievements, it is likely that pupils would miss much valuable experience and training if they were not at times asked to 'compare,' 'explain,' 'discuss,' 'define,' or 'tell why.' They should also be asked to summarize material presented on a topic or to apply certain principles. The following questions taken from Hahn's Scale for Measuring Ability of Children in History appear to require mental processes distinctly different from those called for by the 'new examination.'

1. 'State points of similarity between the position of the United States in 1812 and their position in 1912.'

2. 'Arrange the following events in order of cause and effect: Force Bill, Carpet Baggers, Fifteenth Amendment, Negro Rule in Some of the Southern States, Ku Klux Klan.'

3. 'Name the presidents of the United States since 1892.'

"An intelligent attitude toward the 'new examination.' The simple administration of the new examination and other attractive features should not blind one to

the limitations just mentioned. . . . Written examinations do more than merely secure measures of achievement. If they consist of the right kind of exercises, they afford significant educational opportunities. The educational opportunities of the 'new examination' are necessarily restricted, and it would be unfortunate if it entirely replaced examinations of the traditional type. The new examination, however, has a place. It may be used occasionally in most school subjects. It is useful when a teacher wishes to test the acquaintance of a class with a wide range of facts. It has little diagnostic value and examinations of the traditional type should be used when information is desired concerning the weaknesses of different members of a class. For this reason the 'new examination' is more appropriate for use at the end of a term than for tests during the term which have as their purpose both measurement and diagnosis." It should, however, be remarked that the "new examination" serves as an excellent teaching device, as employed in the study-recitation,[1] and that it is also useful as a test during the term when the teacher's purpose is to test the *specific* effects of instruction which earlier diagnosis has shown to be important for the given class.

"Rules for the preparation and administration of written examinations. — Below, a group of suggested rules governing the preparation and administration of written examinations are given.[2] These represent the opinion of the writers which is based upon a careful

[1] See pp. 131 f. and 275 f.

[2] The purpose of this quotation will not be fully served unless it persuades the reader to consult the original text. Each of the "rules" here quoted is followed in the original text by references to earlier pages in which the given rule is fully explained.

study of the problems involved, as well as upon several years of experience in the measurement of school achievement.

"1. Final examinations should be required. In school subjects such as shop-work, in which the performances secured from pupils are highly objective, the waiving of this requirement may be justified. When final examinations are given, no student should be excused from them because of high daily grades, deportment, or attendance." (Because exemption is an artificial means of encouraging good work, because the examination helps the teacher to form a more reliable estimate of the pupils' accomplishments, and because the examination has educational value in itself.)

"2. The content of final examinations should agree as closely as possible with recognized educational objectives. . . .

"3. The questions should be definite and stated so that all pupils will interpret them alike. Questions relating to items of minor importance should occupy a minor place in examinations. Questions relating to points which have not received attention in the course should be omitted. Frequently in an examination the difficulty of the question is due to the lack of emphasis placed upon it throughout the term because it deals with a relatively unimportant topic. Other topics, difficult in themselves, but emphasized because of their importance, furnish the easier questions.

"4. When the necessary equipment is available the questions should be mimeographed or typewritten so that each student will have a copy on his desk. In case they are written on the board, the teacher should make cer-

tain that all pupils are able to read them correctly. It is well in either case to read the questions aloud to the class.

"5. The examination should be sufficiently difficult so that few pupils will make perfect scores." (This rule should not apply when the purpose of the examination is to determine which students have attained a given standing which includes perfection of performance. Such exceptions should be made, for example, when the purpose is to determine which pupils can correctly interpret a certain passage in literature, history, or foreign language, or which pupils can solve a given problem in mathematics or science.)

"6. Usually the examination should be long enough so that every member of the class will be kept busy for the entire period. It is better to make the examination too long than to have it too short. In this way it becomes possible also to take into account the student's rate of work in determining his grade. Appropriate adjustments can be made in interpreting 'scores' into school 'marks.'" (Clear directions for making such adjustments are found in the original text. Essentially, of course, such adjustment consists in placing a sufficient number of the scores, whatever their numerical values may be, above the passing mark of the particular school.)

"7. In questions asking for a discussion or explanation indicate the completeness of the discussion or the degree of elaborateness expected in the answer.

"8. Time may be economized for both students and teacher by using some form of the 'new examination.' This type of measuring instrument, however, possesses certain limitations which should be kept in mind. The

exclusive use of it would be unwise." (See limitations above quoted.)

"9. Unless the students have a definite understanding of the methods of work which are to be followed, the teacher should give them explicit directions concerning such matters as the order in which the questions are to be answered, the desired arrangement of the work, and any other items in which there is an opportunity for pupils to adopt different procedures. . . .

"10. Approximately ninety minutes should be allowed for a final examination in most high-school subjects. The time which teachers should devote to the preparation of the questions will depend upon their experience and upon their practice during the semester. It is recommended that a teacher make a record throughout the term of questions which in his judgment are suitable for a final examination. From two to three hours should be sufficient for marking a set of twenty-five examination papers. If a teacher finds that a longer time is required, he should endeavor to modify his procedure so that this work can be done more quickly.

"11. Although any weighting of questions by a teacher will be subjective, it is probably desirable to weight the questions, particularly in cases of extreme differences in value. The weighting, however, should be upon the basis of social importance rather than upon mere difficulty." (But see Section II of this chapter, p. 291.)

"12. It is advisable for the teacher to write out at least in an abbreviated form the answers to examination questions before he begins marking the papers. In mathematics and other subjects where a definite answer is required and only one can be accepted as correct,

the need for this rule is not so great as in such subjects as geography, history, literature and certain phases of science. However, a list of correct answers will usually mean a saving of time.

"13. Except in courses in English a pupil's grade should not be intentionally lowered for errors in spelling or for poor handwriting. As a rule the grade should not be lowered because of poor English, unless the quality of the English is evidence of unsatisfactory reasoning. Rules covering these points, as well as others concerning which teachers might differ, should be formulated by the principal in conference with his teachers or at least a committee of them. The rules thus formulated should be carefully followed by all of the teachers.

"14. In marking the papers more accurate results will in general be secured if the answers to one question are marked on all the papers before those for another question are taken up. When it is desired to mark all of the questions on one paper before taking up another, the 'sorting method' should be used. According to this procedure the papers as they are read are sorted into piles, the best ones being placed in the first pile, the next best in the second pile, etc. Five distributions will, in most cases, prove sufficient. After all the papers have been distributed they should be reread, one pile at a time, and compared with each other. If these papers do not possess approximately the same value, changes in the sorting may be made. Grades may then be assigned to the papers in the different piles.

"15. The distinction between 'scores' and 'grades' should be kept in mind. The papers should be marked first in terms of scores. In doing this an appropriate

number of points should be determined for each question. It is not necessary that the total of these points be 100.

"16. The point scores assigned to the examination papers should be translated into school marks. In doing this the use of a standard distribution will be found helpful, and will operate also to decrease the magnitude of the constant errors." [1]

Discussion. — Reread the above suggestions with reference to the test and examination procedure of your school or of a high school with which you are familiar. Check those which are not commonly followed. Mention any considerations which you think might justify a different procedure and supply sufficient evidence to make your case convincing.

Section V: Specific Application

Test construction. — For illustrations of the foregoing suggestions read, if you can, the articles by Byrne and Spencer that are listed in the Selected References; then examine some of the published tests in your special field that are listed in the bibliography, pp. 327 ff.; then construct tests for some one high-school class. Test each of the "effects" listed in Section I of this chapter provided that you consider each of them worth testing in the particular class. Omit those you consider unimportant. Base all of your tests on the same subject matter. If possible, select subject matter on which the high-school class is working at the present time, so that the tests may be given and the results reported to this class. Draw freely upon this chapter

[1] This technique is described in the original text, p. 50.

in attempting to make your own tests serve the following purposes:

1. To determine pupils' ability to use the subject matter in real life situations.
2. To arouse interest in the subject matter.
3. To organize the subject matter by stressing points of chief importance.
4. To reveal points requiring further emphasis.

Marking. — After you have given the tests, determine the relative difficulty of the various questions by the procedure described in Section III above and adjust the scores to a five-point scale of marks; such as A, B, C, D, and E.

Follow-up. — When the test papers have been marked, determine as accurately as you can in which of the abilities tested the class as a whole is most deficient. Then refer to such of the preceding chapters in this text as contain teaching procedures which you think most likely to remedy the defect revealed by your tests. Apply these procedures as the circumstances require, and test again after a sufficient interval.

Selected References

Parallel References for Group Study

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).

Pages 248–251 discuss the relative merits of the commoner types of classroom test.

Lee Byrne — "Using Home-Made Tests in High School," *School Review*, XXX, 536–546 (September, 1922).

The extreme usefulness of the non-standardized test for the high-school teacher's purposes is clearly demonstrated.

C. E. Holley — *The Teacher's Technique* (1922).
Chapter XIV describes procedures for estimating progress and discusses the marking system.

W. S. Monroe assisted by L. B. Souders — "The Present Status of Written Examinations and Suggestions for their Improvement," Univ. of Illinois *Bulletin* XXI, No. 13.
Summarizes criticisms of written examinations as usually conducted with regard both to form and administration, discusses the content of examinations, and offers constructive suggestions toward the reduction of errors with rules for the preparation and administration of written examinations.

H. C. Morrison — *The Teaching Technique of the Secondary School* (1924).
Chapter V, pp. 74 f., discusses the importance and technique of the pre-test in its relation to further testing both during and after instruction in the given unit.

H. W. Nutt — *Principles of Teaching High School Pupils* (1922).
Chapter VIII outlines the use of tests for diagnosis and measurement.

S. C. Parker — *Methods of Teaching in High Schools* (1915).
Chapter XXII discusses measurement of various types of learning. Comments on marks.

P. L. Spencer — "The Improvement of Teaching by Means of 'Home-Made' Non-Standard Diagnostic Tests and Remedial Instruction," *School Review*, XXXI, 276–281 (April, 1923).
The value of such tests as applied to a first-year class in algebra is explained.

Supplementary References for Individual Selection or Assignment

F. Breed — "Administering the Relative Marking System," *School and Society*, April 21, 1917.
Page 474 outlines the Michigan system of marking.

V. E. Dickson — *Mental Tests and the Classroom Teacher* (1922).
A scientific explanation of the value of mental tests to the classroom teacher, but the values described are those which few teachers can derive for themselves without the assistance of the expert. The book is a good introduction to the science of mental testing.

H. C. Hines — *A Guide to Educational Measurements* (1923).
Chapters XIV and XXIII–XXX describe and evaluate the varieties of standard tests in each of the high-school subjects. This book is perhaps more likely to benefit the high-school teacher than others which have appeared in the field of measurement to date.

A. R. Mead — *Learning and Teaching* (1923).
Chapter IX discusses important factors in measurement from the psychological point of view and supplies a good bibliography for further study.

H. O. Rugg — "Teachers' Marks and the Reconstruction of the Marking System," *Elementary School Journal*, XVIII, 701–719 (1918).
This is a constructive study which applies to high-school practice.

Additional References to Be Supplied by the Instructor

CHAPTER XIX

THE REVIEW

WHAT "big ideas" has this course developed and how do these hang together? The review lesson seeks to raise and answer this question in such a way that each learner will take stock of his learning and estimate the relative importance of its various elements. The review, therefore, deserves a place in any list of essential procedures in teaching.

SECTION I: REQUIREMENTS OUTLINED

The function of reviews should be clearly understood before considering important principles of review technique. Essentially the review is an exercise in reflective thinking. It should neither be regarded as primarily a drill exercise nor as a test. "Review," consequently, should mean "new view" rather than "repetition." The review presents familiar material in a new way in order that the given unit of work may be viewed in proper perspective. The purpose of reviews is to *organize*, on a basis most useful to the individual pupil, the material that has just been covered. Like the short article which "reviews" a book, the function of the class review is largely critical. The reviewer examines each significant element, passes judgment on its worth, selects the most valuable elements, determines their proper relation to each other, and finally

passes judgment on the whole work. The review process may be further illustrated by the arrangement of notes which a research student has made in the course of several laboratory experiments. He discards the notes that are not significant, selects those containing important conclusions, and classifies the rest so that he can refer to them most readily in some future connection. In much the same way the pupil who reviews a unit of work should omit details that have served their purpose in leading to really important matters, should select the big pivotal conclusions reached, and should so relate these conclusions that he can make the fullest use of the material studied whenever he has occasion to use it.

Content *vs.* formal subjects. — This interpretation of the review suggests at once that it is more useful in the teaching of the so-called "content" subjects (literature, social science, natural science, *et al.*) than of the "formal" subjects (languages, mathematics, practical arts, *et al.*), since the latter require certain fixed associations that are better repeated as learned than summed up from a new angle of approach. The principles determining the successful review exercise therefore apply more particularly to the content subjects.

Requirements for review procedures:

1. The review exercise should require the pupil to *select* the more important elements in the unit of work reviewed and to *combine* these elements in some useful organization. Useful devices for this purpose include exercises in making summaries and topical outlines, broad questions to be answered out of class, debates, and assigned reports.

2. The review exercise should also require the pupil to *use* these important elements in the solution of *new* problems or exercises, so that he may see their value or recognize his need for further study. The "original" in plane geometry illustrates this type of requirement very clearly.

3. Other important factors in the review exercises can be listed more specifically. The following questions may serve as a guide in estimating the success of review lessons. Most of them should be answered in the *affirmative* with respect to any one teacher's conduct of review work in general.[1]

a. Is each distinct unit of work reviewed when completed rather than at stated calendar periods?

b. Is some review work made a part of each day's assignment to the extent of recalling old material that helps to explain new material?

c. Are the examinations given for review purposes of such a character that in preparing for them the pupil is obliged to select significant points himself rather than memorize the material as first presented in class?

d. Is the purpose of the review lesson to teach the pupil how to organize the material studied so that he may see it in proper perspective?

e. Is the review exercise sufficiently motivated by means of a new approach that gives old material new interest?

f. Is the pupil required to outline and summarize the material so that he may see essential elements in true relationships?

[1] The following list follows closely the list proposed by Burton, which see in the Selected References at the end of this chapter.

g. Does the teacher systematize the pupils' attempt to organize material by providing the class with direction sheets, topical outlines, notebook suggestions, and the like?

h. Does the review exercise require the pupils to apply the material in the solution of new and worthwhile problems?

Section II: Illustrative Review of This Course

This section consists of two review exercises that are intended to help you review the contents of this book, and to illustrate the procedures stated above.

A. *The review should require the learner to select the more important elements in the unit of work covered and to combine these elements in some useful organization.*

Read over the following review assignments and prepare the one you consider likely to help you most in organizing the contents of this book or course:

1. Assume that a prospective high-school teacher of your acquaintance who has never studied the principles of high-school teaching but who can attend some professional training course during his first year of teaching, has asked you to tell him what a course like this is all about and what it is worth in terms of tangible results. Describe the elements of this course in the way you think would be most helpful to such a prospective high-school teacher.

2. Make a rough outline of this course. Do this by selecting as main headings the ten topics you consider most helpful to you. Then develop these by listing five important subtopics under each of your ten main headings. Use the Table of Contents but do not copy it.

3. Outline a somewhat comprehensive reply to each of the following questions:

a. In what specific respects might the application of suggestions contained in this course prove helpful to a teacher whom a principal rates as "deficient in personality"?

b. To what extent has each of the topics discussed in this course "a scientific basis"? Define your interpretation of "science" and point out briefly its application to topics selected from the Table of Contents.

c. Discuss in some detail the proverbial remark: "a good teacher is born and not made" — with respect to the procedures in teaching discussed in this course.

d. What qualifications — professional, social, and intellectual — do you consider essential for a teacher in a high school of about 500 pupils? Construct an original rating scale which outlines these qualifications.

4. Assume that the editor of *The School Review* has sent you a copy of this book and asked you to review it. Write a review of the length and type usually appearing in this journal.

B. *The review exercise should also require the pupil to use these important elements in the solution of new problems or exercises so that he may see their value or recognize his need for further study.*

Solve the following problem:

Make a list of from ten to twenty different procedures in high-school teaching in which you think you most need to improve. In a parallel column state

briefly what you consider to be your present status in each of the factors you have listed, as compared with a teacher of average abilities. In a third parallel column indicate from which of the following sources you think you can expect most help in your effort to improve your command of each of these procedures. Do this by placing after each procedure the numbers which correspond to the sources below:

1. General high-school periodicals; state which you find most useful.

2. Periodicals devoted to your special subjects; *e.g. English Journal, Classical Journal, General Science Quarterly, School Science and Mathematics, The Historical Outlook*, and the like.

3. Books on the *teaching* of your special subjects.

4. Books on general methods in the secondary school.

5. Recent textbooks in your fields.

6. Local, state, and national educational conferences.

7. Professional training courses.

8. Observation of skillful teachers of your subjects in your own school and in others.

C. *Criticize the above exercises* A *and* B *on the basis of the questions listed in Section I, 3, pp. 306 f.*

Section III: Illustrative High-school Reviews

Several review exercises are described below. Select the one which most nearly applies to a high-school course with which you are familiar and discuss in full its strong and weak features.

1. In reviewing study of the characters of Shakespeare's *Macbeth* each member of a twelfth-grade class impersonates a different character in the play and, speak-

ing for that character, gives his opinion of the other characters represented.

2. A tenth-grade Latin class reviews its translation of each book of Cæsar's *Gallic War* by writing a brief war diary in English. Each pupil is assigned some office in Cæsar's army — aide to the general, lieutenant, engineer, messenger, blacksmith, minstrel, and the like — and records such of the campaign events as the holder of such an office would naturally be most likely to observe.

3. A tenth-grade class in ancient history reviews study of the Punic wars by developing "a day in the Roman (or Carthaginian) senate." Various topics are discussed which bear upon the salient points in the military and political campaigns.

4. A teacher of chemistry reviews study of chemical calculations by asking each pupil to supply any chemical equation. Several of these are listed on the board. The class then classifies the equations under the three heads of those involving weight only, volume only, and both weight and volume. Each pupil then solves an equation of each type.

5. A teacher of ninth-grade French reviews the study of verb forms by the spelling bee device.

6. A teacher of tenth-grade geometry reviews each book by means of original propositions involving the most important relationships that are contained in the propositions proved in the text.

7. A class in civics reviews a class debate on an important local issue by writing a record of the debate as a whole and briefs of both affirmative and negative arguments.

8. An eleventh-grade class in English composition reviews its study of verse forms by composing an original poem coöperatively. The teacher develops the poem by writing on the board the lines which are volunteered by members of the class.

Section IV: Specific Application

List the important natural divisions or units of some one high-school course in the form of topics. Then work out one or more review exercises for each of these topics in accordance with the requirements listed in Section I of this chapter.

Selected References

Parallel References for Group Study

W. C. Bagley — *The Educative Process* (1905).
Pages 331–334 state the purpose of the review and the examination.

W. H. Burton — *Supervision and the Improvement of Teaching* (1922).
Important factors of the review lesson are summarized (pages 246–248) and illustrated (pages 456–462).

W. W. Charters — *Methods of Teaching* (1912).
Chapter XXI discusses the review as a means of motivation, as assisting advance preparation, and as a means of organization.

S. S. Colvin — *Introduction to High School Teaching* (1917).
Pages 154 f. discuss the informal test as a form of review.

L. B. Earhart — *Types of Teaching* (1915).
Chapter XIII defines good procedures and discusses the importance of training pupils to review efficiently.

H. H. Foster — *Principles of Teaching in Secondary Education* (1921).
Pages 255–257 summarize the chief requirements of the good review lesson.

C. E. Holley — *The Teacher's Technique* (1922).
Chapter X describes important factors in the review lesson.

G. D. Strayer — *A Brief Course in the Teaching Process* (1911).
Chapter IX urges the importance of application as the distinguishing feature of the review lesson.

Supplementary References for Individual Selection or Assignment

A. I. Gates — *Psychology for Students of Education* (1923).
Pages 285 f. present data concerning the desirable length of practice periods and their distribution.

A. L. Hall-Quest — *Supervised Study* (1916).
See Index for illustrations of review procedures in various high-school subjects.

C. H. Judd — *Psychology of High-School Subjects* (1915).
Pages 466 f. emphasize the review as a means of obtaining perspective.

A. R. Mead — *Learning and Teaching* (1923).
Pages 258 f. contain exercises for the teacher to solve which relate review technique to the psychological factors explained.

H. L. Miller — *Directing Study* (1922).
The description of "organizing principles" suggests useful review devices.

E. L. Thorndike — *Educational Psychology* (1914).
Volume II., Chapter IX, presents evidence on which principles of drill teaching have been based and which indicates the relation of reviews to rate of learning.

Additional References to Be Supplied by the Instructor

APPENDIX

Selected Bibliographies for High-school Teachers

Periodical Literature:

Every secondary school teacher should regularly consult or subscribe to that one of the journals listed below which most directly applies to the subjects he teaches. Such reading, if systematically kept up, need not require more than from three to six hours per month, depending upon the nature of the subjects taught. This reading is essential to professional growth, since the value of the periodical selected is by no means confined to those few articles it contains which the teacher can apply directly to the improvement of his teaching. A far greater value lies in the notices and reviews of recent textbooks in the given field and in the references to a wide range of articles in other publications. From these the teacher can count on much direct assistance. He should also be assisted indirectly by a knowledge of what progressive workers are doing in his own and related fields. Most of the periodicals listed below contain such reviews and references to pertinent articles in other publications.

In case the periodical selected does not contain these features, the teacher should make a practice of consulting the *Record of Current Educational Publications* which is issued by the Bureau of Education, Washington, D. C. This bulletin can be found in any library which is a depository for government documents or it may be purchased from the Superintendent of Documents, U. S.

Printing Office, Washington, D. C., for ten cents a copy. This bulletin contains a list of approximately all significant writings upon educational topics that have appeared during the months which each issue covers. These writings are classified according to the subject discussed, and each reference is followed by a brief statement of the writer's conclusion or purpose. It is thus possible by means of this bulletin to locate most of the contributions to current professional literature which bear directly upon the teacher's own problems.

English. — *English Journal*, University of Chicago Press, Chicago, Ill.
Drama Quarterly, Riggs Building, Washington, D. C.
Correct English — How to Use It, Evanston, Ill.
Quarterly Journal of Speech Education, University of Chicago Press.

Foreign Languages. — *Modern Language Journal*, 68th Street and Park Avenue, New York City.
Classical Journal, University of Chicago Press.
Modern Language Teaching, London, England.

Social Science. — *Historical Outlook*, McKinley Publishing Co., Philadelphia, Pa.
Journal of American History, 37 West 39th Street, New York City.
Journal of Geography, Broadway and 165th Street, New York City.
American Political Science Review, Madison, Wisconsin.
American Journal of Sociology, University of Chicago Press.
The American Historical Review, The Macmillan Co., N. Y.

Mathematics. — *The Mathematics Teacher*, Syracuse, N. Y.
School Science and Mathematics, Mt. Morris, Ill.
American Mathematical Monthly, Lancaster, Pa.

Natural Science. — *General Science Quarterly*, Salem, Mass.
School Science and Mathematics, Mt. Morris, Ill.
High School Science Review, Austin, Texas.

Hygiene and Physical Education. — *American Journal of School Hygiene*, Worcester, Mass.
Physical Training, 347 Madison Avenue, New York City.
American Physical Education Review, 93 Westford Avenue, Springfield, Mass.

Manual Arts. — *Manual Training Magazine*, Manual Arts Press, Peoria, Ill.

Industrial Education Magazine, 129 Michigan Street, Milwaukee, Wis.

Home Economics. — *Journal of Home Economics*, Station N., Baltimore, Md.

American Cookery, 221 Columbus Avenue, Boston, Mass.

Commercial. — *Business Educator*, Columbus, Ohio.

Various current manuals for stenographers and typists.

Art. — *School Arts Magazine*, 120 Boylston Street, Boston, Mass.

Vocational. — *Vocational Education*, World Book Co., Yonkers-on-Hudson, N. Y.

General Publications. — *School Review*, University of Chicago Press.

Journal of Educational Research, Public School Publishing Co., Bloomington, Ill.

Educational Administration and Supervision, Warwick & York, Baltimore, Md.

School and Society, Science Press, Garrison, N. Y.

Journal of Educational Method, World Book Co., Yonkers-on-Hudson, N. Y.

Educational Review, Doubleday Page & Co., Garden City, L. I.

Bulletin of High Points in the Work of the High Schools of New York City, 500 Park Avenue, New York City.

High School Journal, Chapel Hill, N. C.

Teachers College Record, Columbia University, New York City, N.Y.

Each of the above general periodicals, whether or not confined to the discussion of high-school problems, contains an abundance of information concerning publications and events of professional interest to high-school teachers.

Books on the Teaching of Special High-school Subjects:

The first place in a list of books under the above classification can usually be given to the report of The N. E. A. Commission on the Reorganization of Secondary Education, whenever the Commission has issued a report upon the subject in which the teacher is interested.

The high-school subjects upon which these reports are at present available are indicated in the titles below.

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	1917, No. 2, Reorganization of English in Secondary Schools	20	15		
	1917, No. 49, Music in Secondary Schools	5	4		
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	1919, No. 55, Business Education in Secondary Schools	10	5		
	1920, No. 1, The Problem of Mathematics in Secondary Education	5	3		
	1920, No. 26, Reorganization of Science in Secondary Schools	10	3		
	1920, No. 35, Agriculture in Secondary Schools	5	3		
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The references on the teaching of the high-school subjects listed below have been selected on the basis of three criteria; namely, direct usefulness to the classroom teacher, recency of publication, or scope of the bibliography contained. One book is starred in each field.

English

G. R. Carpenter — *Teaching of English in the Elementary and the Secondary School*, 1903. Bibliography. Longmans, Green & Co.

Detroit Public Schools — *High School Handbook in English.* Parts II, on Methods, and III, on Materials, contain concrete suggestions.

M. B. Hooton — *Course of Study in English Language and Literature for Junior and Senior High Schools*, 1917. Bibliography. Longmans, Green & Co.

A. L. McGregor — *Supervised Study in English*, for Junior High School Grades, 1921. Bibliography. The Macmillan Co.

Maryland State Dept. — *The Teaching of High School English*, 1921. Bibliography.

New York State Dept. — *Syllabus in English Language and Literature for High Schools*, 1917. Bibliography.

S. E. Simons — *Dramatization.* Selections from English Classics adapted in Dramatic Form, 1913. English Problems in the Solving in the Junior and Senior High School, 1920. Bibliography. Scott, Foresman & Co.

Clarence Stratton — *Teaching of English in the High School*, 1923. Bibliography. Harcourt, Brace & Co.

C. S. Thomas — **The Teaching of English in Secondary Schools*, 1917. Bibliography. Houghton Mifflin & Co.

Classical Languages

C. E. Bennett and G. P. Bristol — *The Teaching of Latin and Greek in the Secondary School*, 1901. Chapter References. The Macmillan Co.

H. A. Brown — *Latin in Secondary Schools* (latter part), 1920. Bibliography. Oshkosh State Normal School, Wis.

J. B. Game — **Teaching High School Latin.* A handbook. 1916. Bibliography. University of Chicago Press.

F. E. Sabin — *Handbook for Latin Teachers,* Univ. of Illinois *Bulletin,* Whole No. 754. Urbana, Ill.

Modern Languages

H. G. Atkins and H. L. Hutton — *The Teaching of Modern Languages in School and University,* 1920. Bibliography. Arnold, London.

E. Gourio — *The Direct Method of Teaching French,* 1921. Houghton Mifflin Company.

C. H. Handschin — *The Teaching of Modern Language in the U. S.,* U. S. Bureau of Education *Bulletin,* 1913, No. 3, pages 94–101. Describes typical methods of teaching and Part II contains an extensive bibliography of teacher's aids.

—**Methods of Teaching Modern Languages,* World Book Co., 1923. Contains an excellent bibliography of American contributions to methodology and, at the close of each chapter, a list of specific teaching devices that are clearly presented and practical.

Illinois, University of — *School of Education Bulletin* No. 12, 1918. "Suggestions and References for Modern Language Teachers." Excellent bibliography, pages 12–13.

E. C. Kittson — *Theory and Practice of Language Teaching,* especially French and German, 1918. Bibliography. Oxford University Press.

H. E. Palmer — *The Scientific Study and Teaching of Language,* 1920. Bibliography. World Book Co.

— *The Oral Method of Teaching Language,* 1922. Bibliography. World Book Co.

L. A. Wilkins — *Spanish in the High School.* 1921. A handbook of methods with special reference to the junior high school, and applicable to all modern language teaching. B. H. Sanborn & Co.

Mathematics

U. S. Bureau of Education Bulletins — 1920, No. 1. *The Problem of Mathematics in Secondary Education.*

1920, No. 6. *Secondary School Circular, Junior High School Mathematics.*

National Council on Math. Requirements, J. W. Young, Chairman, Dartmouth College — * *The Reorganization of Mathematics in Secondary Education*, 1923. Extensive bibliography of periodical literature annotated and classified. Easily the most comprehensive treatment available.

H. O. Rugg and J. R. Clark — *Scientific Method in Reconstruction of Ninth-grade Mathematics*, 1918. University of Chicago Press.

D. E. Smith — *The Teaching of Geometry*, 1911. Bibliography. Ginn & Co.

J. W. A. Young — *The Teaching of Mathematics in the Elementary and the Secondary School*, 1907. Longmans, Green & Co.

Natural Science

W. L. Eikenberry — *The Teaching of General Science*, 1922. Bibliography of periodical literature. University of Chicago Press.

J. O. Frank — *Teaching First Year Chemistry* (published by the author, Oshkosh, Wisconsin), 1924 (revised). Part III contains specific information for the teacher including a list of individual projects, exhibits, bibliographies, and much other valuable material.

W. F. Ganong — *The Teaching Botanist*, 1910. Bibliography. The Macmillan Co.

G. H. Lester — *Natural Science in the Secondary School.* A digest of recent literature. *General Science Quarterly*, Vol. 5, 1–15.

C. A. McMurry — *Special Methods in Elementary Science for the Common School* (first part applies equally to secondary grades); 1919. The Macmillan Company.

R. D. Rusk — *How to Teach Physics*, 1923. Especially chapters IV, V, XI, and XIII. J. B. Lippincott Company.

J. A. Thomson — *Introduction to Science*, 1911. Bibliography. Henry Holt & Co.

G. R. Twiss — * *A Textbook in the Principles of Science Teaching*, 1919. Bibliography. The Macmillan Company.

J. F. Woodhull — *The Teaching of Science*, 1918. The Macmillan Company.

Social Science

E. C. Hartwell — *The Teaching of History*, 1913. Houghton Mifflin Company.

E. R. Hazluck — *The Teaching of History*, 1920. Bibliography. Cambridge University Press.

M. Hill — *The Teaching of Civics*, 1914. Chapter references. Houghton Mifflin Company.

H. Johnson — *The Teaching of History*, 1916. Bibliography. The Macmillan Company.

M. W. Keatinge — *Studies in the Teaching of History*, 1910. Black & Co., London.

M. E. Simpson — *Supervised Study in History*, 1920. Bibliography. The Macmillan Company.

E. E. Smith — *Teaching Geography by Problems*, 1921. Chapter references. Doubleday, Page & Co.

R. M. Tryon — * *The Teaching of History in Junior and Senior High Schools*, 1921. Bibliography. Ginn & Co.

Books on General Methods of High-school Teaching:

W. H. Burton — *Supervision and the Improvement of Teaching.* D. Appleton and Company, 1922.

While written primarily for supervisors of teaching in all grades, this discussion of principles of teaching is so organized that high-school teachers can find much help in Chapters IV–XI of Part II. Outlines and summaries at the end of each chapter make it easy for the high-school teacher to select whatever the chapter contains that applies to his own problems. Each chapter is followed by a well-selected and annotated bibliography.

S. S. Colvin — *An Introduction to High School Teaching*, The Macmillan Company, 1920.

This is perhaps the most useful book for high-school teachers in general on account of the abundance of explicit illustration. It is particularly useful to prospective teachers and to teachers in their first year of high-school work. The contents of many of the chapters have been outlined in this text and in the Selected References. The bibliography covers eleven pages and is classified according to the various chapter headings. The appendix

contains a discussion of problems most often met by the novice, an outline for the observation of high-school teaching, and suggestive lesson plans for the commoner high-school subjects. The index is detailed and helpful in locating discussions of specific problems.

H. H. FOSTER — *Principles of Teaching in Secondary Education*, Charles Scribner's Sons, 1921.

An entirely safe and somewhat formal discussion of typical teaching procedures. Most useful, perhaps, for the analysis it makes of high-school teaching in general. This analysis is logical and systematic and offers a good background for more specific references. The discussions of appreciation and laboratory procedures in Chapters IX and XI are worth particular attention. Each chapter is summarized and followed by supplementary readings, which are not annotated. The index is well organized and detailed.

A. L. HALL-QUEST — *Supervised Study: A discussion of the study lesson in high school*, The Macmillan Company, 1919.

While chiefly concerned with the mechanics of the study lesson in junior and senior high schools, this treatment of "study" is sufficiently broad to include most of the teacher's classroom problems. Procedures are described in great variety and in great detail. Part II sets forth special methods of supervising the study of various subjects and describes them in sufficient detail to make their selection and application easy. The bibliography is classified under five important divisions of the topic and is complete for most purposes.

C. H. JOHNSTON — *The Modern High School*, Charles Scribner's Sons, 1914.

This book deals largely with problems of administration and consists of articles by various authorities in different fields. Chapters VIII–XI deal with classroom procedures and give a perspective that is valuable. The classified bibliography of sixty-seven pages is perhaps the most important feature of the book in that it directs the teacher to discussions of classroom problems in their relation to the school as a whole. This bibliography represents quite adequately the range of high-school literature prior to the date of publication.

C. H. JUDD — *Psychology of High School Subjects*, Ginn and Company, 1915.

The mental traits involved in study of the various high-school subjects are distinguished and defined as objectives of instruction. When the book is studied in course, these objectives can be related to the teaching procedures by which they are usually best accomplished. The teacher may thus be helped to evaluate teaching procedures in the given subject in terms of their psychological effects. When the book is studied independently, the reader is likely to use his time to the best advantage if he selects from the Table of Contents those passages which discuss classroom procedures in the given subject and then consults such other parts of the chapter as are necessary to support the author's conclusions. The volume is helpfully indexed.

H. G. LULL and H. B. WILSON — *The Redirection of High School Instruction*, J. B. Lippincott Company, 1921.

A description and defense of the socialized school with particular reference to the junior high-school grades. The discussion of problem-project methods is a prominent feature. The various junior high-school subjects are reviewed with emphasis of teaching procedures, and various high-school problems are discussed from the angle of socialized and problem-project teaching. The bibliography is well selected for the purpose of the book, which does not undertake to deal with those problems of high-school instruction to which the principles of socialization do not directly apply.

H. L. MILLER — *Directing Study*, Charles Scribner's Sons, 1922.

This book is a convincing argument for the substitution of "thinking periods" in place of "recitation periods." It sets forth a significant ideal in high-school teaching. The book should accordingly be read by every high-school teacher as a source of inspiration toward improving his technique of teaching pupils how to think. The classroom procedure recommended is best justified from the administrative point of view. The volume contains no bibliography, but a section of "suggestive helps and problems for teachers" serves to apply the text to a wide range of classroom problems that are not directly discussed.

H. C. Morrison — *The Teaching Technique of the Secondary School*, Edwards Bros., Ann Arbor, Michigan, 1924 (preliminary edition.)

This is perhaps the most intensive study of general method in the secondary school that has yet appeared. It consists largely in the analysis of "mastery" and discussion of the procedures by which mastery is best secured. Part I analyzes the objectives of teaching in terms of specific "products of learning" whose importance in real life situations is great. These "products" are defined by means of data experimentally derived. Procedures for the efficient attainment of these products in the classroom are described in Chapter V. Part II discusses control technique in terms of motivation and measurement of the pupils' application. Case-study profiles are submitted which emphasize the need for individualized procedures. The study as a whole provides an excellent basis for the isolation of elements in class-instruction for experimental study by the student of high-school method. Other "Parts" are in preparation.

H. W. Nutt — *Principles of Teaching High School Pupils*, The Century Co., 1922.

An outline of the principles of high-school instruction from a somewhat general point of view. The book presents a useful background by defining important factors in teaching in a very simple and clean-cut manner. It is less important in the study of classroom procedures. The chapter references are well selected and briefly annotated.

S. C. Parker — *Methods of Teaching in High School*, and *Exercises*, Ginn and Company, 1915 and 1918. (Two revisions.)

Similar in content and purpose to S. S. Colvin's *Introduction to High School Teaching*, but somewhat more analytic in its discussion of teaching procedures and less extensive in the illustrations supplied. The companion book of *Exercises* serves to bridge this gap between the principles discussed in the text and the teacher's own problems. The illustrations contained in the *Exercises*, while closely confined to the points discussed in the text, represent a wide range of excellent procedures which every teacher may study with profit. Each chapter is followed by bibliographical notes which bear directly upon the contents of the chapter and are briefly annotated.

W. E. STARK — *Every Teacher's Problems*, American Book Company, 1922.

The actual classroom problems presented are divided about evenly between those of the elementary school and those of the high school. Most of the high-school problems that are found in each chapter are convincingly real and therefore very stimulating to a reader who takes time to think them through with the guidance which the author supplies by his own solution of similar problems. Only one chapter is given to "problems of method" and most of the problems in this chapter are confined to elementary school practice. The rest of the book is largely concerned with problems of discipline, subject matter, and professional relationships, which apply equally well to high-school teaching. These problems, if solved in relation to the teacher's own work, are likely to place the teacher in a position where method can safely take care of itself.

(The criticisms contained in the above notes represent the majority opinions of various classes of high-school teachers in training rather than the writer's personal estimates.)

Three Useful Bibliographies:

A List of Bulletins of the Bureau of Education, 1906–1922, with index by writer, title, and subject. U. S. Bureau of Education *Bulletin*, 1923, No. 35.

Inasmuch as nearly every phase of high-school work has been treated to some extent in some one of these bulletins, this index should be in the possession of every teacher.

Report of Committee of Fifteen, California High School Teachers' Assn. (1924), Phelan Bldg., San Francisco. Pages 303–401 contain a well-rounded bibliography and teachers' aids. The references include books on special method and supervision, periodicals, monographs, tests, associations, publishers, and textbooks. The references are classified according to subject and fully annotated though the annotations are not critical.

"Extra-curricular Activities of Secondary Schools," by E. K. Fretwell, *Teachers College Record*, Vol. 24, 60–72, 147–158. A list of references concerning the selection, organization, financing, and general supervision of extra-class activities.

A List of Supplementary References on Secondary Education:

The following references do not discuss methods of high-school teaching but discuss other elements in the organization of high-school work about which it is no less important for teachers to be informed. These books are intended to meet the needs of teachers who have made no special study of the problems of secondary education as a whole. They have been selected by such teachers in training from a list of some thirty titles, and the reasons offered for the selection of these five books are briefly indicated in the note which follows each reference. The books are listed below in what a large majority of the teachers consulted have judged to be the order of relative importance.

A. J. Inglis — *Principles of Secondary Education*, Houghton Mifflin Company, 1918.

A systematic analysis of the factors and principles involved in a constructive theory of secondary education. Data are collected from a wide variety of reliable sources with respect to the characteristics of high-school pupils, the social purposes of secondary education, and the desirable objectives in the teaching of the various subjects. The use of the book for purposes of general reference is simplified by the excellent Table of Contents.

G. S. Counts — *The Selective Character of American Secondary Education*, The University of Chicago Press, 1922.

A study of the social status of high-school pupils in communities of different types. The teacher's understanding of what the high school is for will become clarified by a study of the data presented. The book is a clear indication of the extent to which secondary education is meeting the needs of various social classes at the present time.

W. W. Charters — *Curriculum Construction*, The Macmillan Company, 1923.

An explanation of the technique employed in the organiza-

tion of curricula upon a scientific basis. A wide range of social and vocational activities for which school courses are intended to prepare is analyzed in order to suggest how the most useful contents of such courses can be determined. The method of such analysis is made sufficiently plain to suggest how teachers can evaluate subject matter in terms of the use which pupils will make of it.

IRVING KING — *The High School Age*, Bobbs-Merrill Co. 1914.

A study of adolescent boys and girls with particular reference to the sort of treatment the individual pupil must receive in school to secure his full coöperation. The text is very readable and a necessary supplement to the tabulated data concerning high-school pupils that are found in various books of reference.

W. A. MCCALL — *How to Experiment in Education*, The Macmillan Company, 1924.

Describes and illustrates the technique employed in the investigation of educational problems. While the scope is not restricted to the secondary field, the technique is presented in a manner which will enable the investigator of problems in high-school procedure to collect and interpret data to better advantage.

J. K. VAN DENBURG — *The Junior High School Idea*, Henry Holt and Company, 1922.

A description of the Speyer Experimental Junior High School in New York City and a discussion of the principles upon which the work of the school was organized. This discussion takes up the factors in the organization of secondary schools in general and outlines procedures in the teaching of the junior high-school subjects. The point of view which the author presents is supported by the results accomplished and is a challenge to the average reader.

A List of Published Tests for High-school Use:

In preparing this list an effort has been made to include such tests in each subject as are most easily used to diagnose a high-school class and to discover individual pupils who require particular attention. They are thus

intended for the immediate use of the classroom teacher who is less interested in group standards than in the problem of locating the difficulties of individual pupils. Most of the tests here listed can be used to some advantage by teachers who have received no training in the technique of educational measurement but who are familiar with such references as are listed in the *Selected References* of Chapter IV, pp. 58–62. The *Bibliography of Educational and Psychological Tests and Measurements, by* B. R. Buckingham, published by Bureau of Education, Washington, D. C., *Bulletin* 1923, No. 55, contains most of such other tests as high-school teachers may require for particular purposes.

General-ability Tests

T. L. Kelley — *Interest Tests.* Described in "Educational Guidance," pages 40–45, Teachers College Contributions to Education, No. 7, 1914, and published by Bureau of Publications, Teachers College, Columbia University, New York.

W. S. Miller — *Miller Mental Ability Test.* For use in grades 7 to 9 and with college freshmen. World Book Co.

A. S. Otis — *Otis Group Intelligence Scale, Advanced Examination.* World Book Co.

H. O. Rugg — *A Rating Scale for Judging High School or College Students.* University of Chicago Bookstore, 5802 Ellis Street, Chicago.

L. M. Terman — *Terman Group Test of Mental Ability.* World Book Co.

R. M. Yerkes — *National Intelligence Tests.* World Book Co.

Subject-matter Tests

English

W. W. Charters — *Charters Diagnostic Language and Grammar Tests.* For Junior High School grades. Public School Publishing Co., Bloomington, Ill.

W. S. Monroe — *Monroe's Standardized Silent Reading Tests.* Useful for diagnosis. Can be given in five minutes. Bureau of Educational Research, University of Illinois, Urbana, Ill.

M. R. Trabue — *Completion Tests Language Scales L. and M.* Used to measure general language ability. Bureau of Publications, Teachers College. Seven Spelling Scales for Secondary Schools. Described in *Teachers College Record*, September, 1920. The article outlines a simple method by which various lists of important words may be constructed by the teacher for instruction as well as testing.

E. L. Thorndike and W. A. McCall — *Thorndike-McCall Reading Scale.* Bureau of Publications, Teachers College.

E. L. Thorndike — *Scale for Measuring the Understanding of Sentences, Part II.* Bureau of Publications, Teachers College.

—— *Visual Vocabulary Scale.* Bureau of Publications, Teachers College.

—— *Thorndike Extension of the Hillegas Scale.* Used to measure the quality of English compositions. Bureau of Publications, Teachers College.

G. M. Wilson — *Wilson Language Error Test.* Measures ability to detect common language errors. For grades 3 to 12. World Book Co.

Foreign Language

H. A. Brown — *Latin Tests.* A series of six tests intended to measure six abilities renders these useful for diagnostic purposes at the end of the first year of Latin study. Parker Education Co., Madison, Wis.

C. H. Handschin — *Silent Reading Test A*, in French or Spanish, *Silent Reading Test B*, in French, and *Comprehension and Grammar Test A*, in French. World Book Co., N. Y.

V. C. A. Henmon — *Henmon French Tests and Henmon Latin Tests.* World Book Co., N. Y. Chief emphasis is laid on vocabulary.

L. A. Wilkins — *Predetermination Test in Modern Language.* Intended to diagnose abilities in foreign language at the outset of the course. See *Journal of High Points*, Board of Education, N. Y., February and October, 1919.

Mathematics

H. R. Douglas — *Diagnostic Tests for First-year Algebra.* University of Oregon, Eugene, Oregon.

H. G. Hotz — *First-year Algebra Scales.*
Best used to determine group standards. Bureau of Publications, Teachers College.

J. H. Minnick — *Geometry Test.*
Applicable after the first two books in plane geometry have been completed. University of Pennsylvania, Philadelphia, Pa.

A. L. Rogers — *Rogers Test of Mathematical Ability.*
Suitable for use in junior high schools if pupils have had some work in algebra and geometry. Bureau of Publications, Teachers College.

H. O. Rugg and J. R. Clark — *Rugg-Clark Standardized Test in First-year Algebra,* together with practice exercises to correct deficiencies revealed by the tests.
Tests supplied by University of Chicago Press, Chicago; practice exercises by School of Education, University of Chicago.

R. S. Schorling — *A Test in Plane Geometry,* with practice sheets. Lincoln School of Teachers College, N. Y.

Social Science

A. S. Barr — *Preliminary Diagnostic Tests in American History.* Bureau of Educational Research, University of Illinois, Urbana, Ill.
A useful teaching device.

C. L. Harlan — *Test of Information in United States History.* Public School Publishing Co., Bloomington, Ind.

S. M. Upton and C. F. Chassell — *A Scale for Measuring Habits of Good Citizenship.* Bureau of Publications, Teachers College.

C. G. Vannest — *Diagnostic Test in Modern European History.* Coöperative Research Bureau, Bloomington, Ind.

M. J. Van Wagenen — *American History Scales.*
A suggestive model for class exercises. Bureau of Publications, Teachers College.

Natural Science

H. L. Camp — *Scales for Measuring Results of Physics Teaching.* See Studies in Education, Vol. II, No. 2. University of Iowa, Iowa City, Iowa.

N. M. Grier — *Zoölogy Test.* See *Journal of Educational Psychology*, Vol. 9, 338.

Hayes-Seth — *Chemistry Test.* A series of selected questions to be asked in class. See *Journal of Educational Research*, Vol. IV, 109 ff.

J. P. Herring — *Scientific Thinking Test.* See *Journal of Educational Psychology*, Vols. 9, 535–538, and 10, 417–433.

A series of exercises suitable for teaching devices which call for various abilities useful in scientific thinking.

P. A. Maxwell — *Tests in General Science.* See *General Science Quarterly*, Vol. 4, 443–450.

Tests range of information and reasoning ability.

S. R. Powers — *Chemistry Tests.*

Tests range of information and ability to perform mechanical operations. See *School Science and Mathematics*, Vol. 21, 366–377.

C. M. Ruch — *Range of Information Test in General Science.* See *General Science Quarterly*, Vol. 4: 257–262. Can be used at the outset of the course.

Ruch-Popenoe — *General Science Test.* World Book Co., Yonkers-on-Hudson, N. Y.

Useful for preliminary diagnosis.

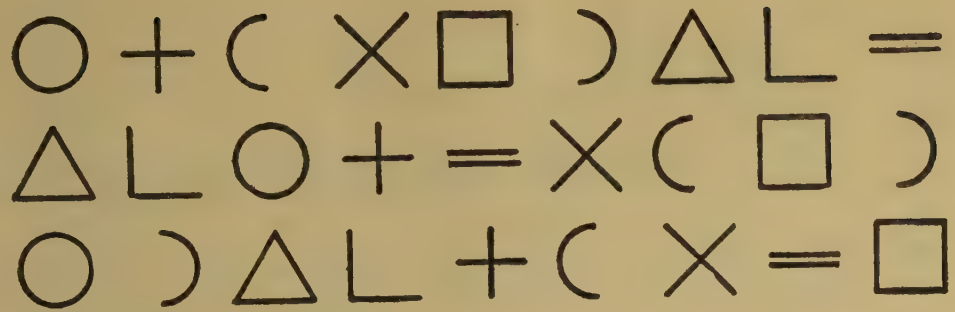
Vocational

J. L. Stenquist — *Stenquist Mechanical Aptitude Tests.*

Useful in diagnosing promise of success in science and shop work of pupils in grades 6 to 12. World Book Co.

L. L. Thurstone — *Thurstone Vocational Guidance Tests.*

Five tests intended for twelfth-grade pupils to indicate probable success in schools of engineering. The tests are suggestive of other uses.



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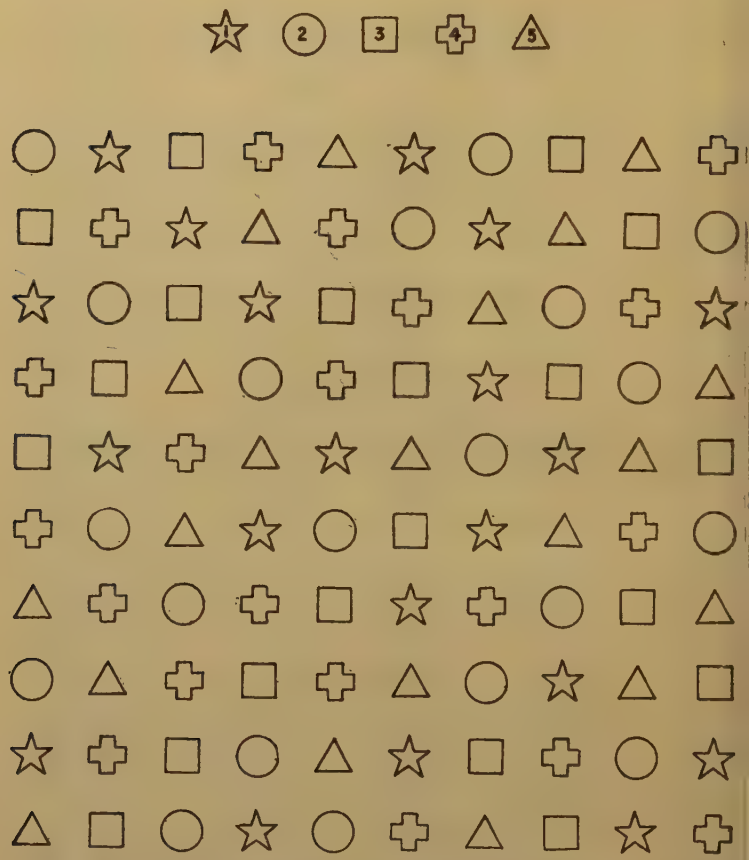

Woodworth and Wells Substitution Test. Reproduced by permission of the publishers, C. H. Stoelting Co., Chicago, Ill. See p. 52.

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YRQAQEAXJUDFOIMWZSAUCGVAOABMAYDYAAZJDAL

JACINEVBGAOFHARPVEJCTQZAPJLEIQWNAHRBUIAS

SNZMWAAAWHACAXHXQAXTDPUTYGSKGRAVLGKIM

FUOFAAKYFGTMBLYZIJAAVAUAACXDTVDACJSIUFMO

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WARBTHJJANEEFAAMEAACBSVSKALLPAJNRMPKAZF

Wallin Cancellation Test. Reproduced by permission of the publishers, C. H. Stoelting Co., Chicago, Ill. See p. 52.

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